Contractors and Engineers Monthly

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Highlights Of This Issue

- **Unusual Bridge Job**
  Two steel bridges, constructed over dry land, were completed recently as the final links in highway and railroad transportation over the Wax Lake Outlet channel draining the Atchafayala Floodway in Louisiana. See page 2.
- **Town Road Mix**
  The Town of Middleboro, Mass., has recently improved some of its old gravel roads by means of road mix with tar, using aggregate from the Town-owned gravel plant. See page 2.
- **Snow Removal Aids Maintenance**
  One of the problems of highway departments is that of keeping its roads in good condition during the spring break-up. North Dakota has found a solution by directing all its late-winter activities to that end, throwing the accumulated snow back off the shoulders, providing waterways and other means to insure adequate drainage. See page 7.
- **Inter-American Highway**
  With the President's request for a $20,000,000 appropriation to speed the completion of the Inter-American Highway from the U.S.-Mexico border to Panama, this 3,252-mile route becomes of even greater interest. E. W. James, in charge of this project for the United States, describes the progress made and the plans for its future. See page 9.
- **Planting on Medial Strips**
  The treatment of narrow medial strips, particularly where these strips come into existence because of widening or reconstructing old highways, is one of the many problems of roadside development and highway safety. An interesting discussion of one such problem in Ohio and suggestions for the proper planting on narrow medial strips appear in this issue. See page 15.
- **Well-Planned Asphalt Plant**
  A Rhode Island contractor, handling many highway jobs in that section of New England, set up a well-planned and laid-out asphalt plant which will produce either hot or cold mix, as his work requires. See page 32.

IN THIS ISSUE

Pouring the flood wall at Kittanning, Penna., with a special bucket.

Stone Revetment And Flood Wall

Section of Kittanning, Pa., Protected With Flood Wall And Blanket of Stone Laid To Protect Abutment, Dam 7

✦ DURING the 1940 construction season Stewart O. Strandberg, of Chicago, Ill., completed a contract for the U. S. Engineer Department at Kittanning, Pa., on the left bank of the Allegheny River, involving 4,220 feet of concrete flood wall and 500 feet of stone revetment. This project is designed to protect a partially developed residential district and an industrial area lying between the river bank and the Pennsylvania Railroad, all upstream of Dam No. 7 on the Allegheny River. The

(*Continued on page* 22)

Floors of Hangars Paved with Concrete At Army Air Base

(*Photos on page* 48)

Base and Flight Hangars For Westover Field Near Chicopee Falls, Mass., Near Completion for Early Use

✦ THE U. S. Army has greatly enlarged the facilities for training at its Air Base at Westover Field, located near Chicopee Falls, Mass., through the construction of a base hangar and the initial set of four flight hangars. Work on the hangars was started on July 22, 1940, and is under the direction of the U. S. Engineer Department. The general contractor is The Tuller Construction Co. of Red Bank, N. J. The Base Hangar is numbered 1, while the four flight hangars, constructed on a line at 45 degrees to the base hangar, bear the odd numbers from 3 to 9. Space is available for the duplication of the flight hangars on the other side when required, and the new group would bear the even numbers from 2 to 8.

The Base Hangar has a floor area 209 x 275 feet, with additional lean-to's outside the main walls, and a full-opening rolling door operating on tracks to provide a doorway 200 feet wide by 38 feet high. The flight hangars are 209 x 225 feet inside measurement, with doorways the same as the larger hangar. Excavation for the foundations was started on Hangar 9, working back to No. 1. A total of 18,000 cubic yards of concrete was required for the foundations, floors and roofs over the lean-to areas; 4,300 tons of structural steel for the framing of the floor and roof systems above ground; and 1,300,000 square feet of walls, ceiling, steel and sash to be painted.

The bow-string arched girders supporting the roof of the main hangar space have a span of 255 feet extending into the lean-to's. The tie rods of the bow strings are completely encased in asphaltic concrete to prevent deterioration from rust and are carried through the ground 15 inches below the low point of the concrete floor. The superstructure was erected and roofed over during the winter and the paving of the concrete floors started in the spring.

Excavation and Fill

The first operation in starting the hangars was to cut the hay which covered the sandy soil. Then LeTourneau Carryalls were used to remove and stockpile the top soil, following which the hangar foundation was excavated and the actual construction begun. An average of about 3 feet of fill was required within each hangar or a total of about 11,000 cubic yards for the five. This sand and gravel fill provides the subgrade for the concrete paving for the hangar floors. Sumps were excavated outside of the hangars and pumps used to deliver the ground water for puddling the fill as it was placed to provide a firm base for the paving.

Preparation for Paving

Following the sprinkling of the subgrade, it was rolled with a 5-ton tandem

(*Continued on page* 10)

C. & E. M. Photo

Hangar No. 7 at Westover Field, Army Air Base, near Chicopee Falls, Mass.

New Bridges Built In a Novel Manner

Two Highway and Railroad Bridges Over the Wax Lake Outlet, La., Constructed On Dry Land in Two Ways

(*Photos on page* 48)

✦ COMPLETING the links of highway and railroad bridges over the Wax Lake Outlet channel draining the Atchafalaya Floodway extending from Morganza, La., on the north, to the Gulf of Mexico, and the Charenton Drainage and Navigation Canal, draining an area west of the Floodway, are two pairs of bridges, one pair near Baldwin, La., over the Charenton Drainage and Navigation Canal and the other pair near Calumet, La., over the Wax Lake Outlet channel.

Erection of the bridges over the Wax Lake Outlet channel was greatly facilitated by the narrow strip of land left in place at the site to carry highway and railroad traffic until the new structures were completed. The three spans of the highway bridge were erected on falsework at one end of the structure and floated to position, while the steel of the Southern Pacific Railroad bridge was supported during erection by huge steel wedge jacks on mud sills.

Dredging of the Wax Lake Outlet channel for carrying flood waters was begun in 1938 and is expected to be completed in 1941. On the north side of the narrow strip of land carrying U. S. 90, the main east and west transcontinental route of the South, and the main line of the Southern Pacific Railroad, the channel has been dredged to —45 feet mean Gulf level for a bottom width of 300 feet, and on the south side to —45 mean Gulf level with a 400-foot bottom width through Wax Lake, a shallow lake averaging about 6 feet in depth. That portion of the channel north of the narrow strip has been completed and the portion on the south side which will extend to the Gulf of Mexico is expected to be completed this year.

Highway Bridge Design

The highway bridge, designed by the Bridge Division of the Louisiana Department of Highways, is a 3-span steel bridge with modified K-type trusses. The center span is 510 feet and the truss 73 feet deep at its highest point, while the two end spans are each 351 feet, with a maximum height of 50 feet. The structure is designed for an H15 loading. The bridge carries a 24-foot roadway and a sidewalk 2½ feet wide and 4 inches thick at each side. The roadway is of reinforced concrete with the steel both top and bottom and a 6½-inch thick slab.

The narrowness of the sidewalks is of interest. This structure will not be used greatly by pedestrians, but by providing a narrow sidewalk at each side of the roadway those pedestrians who are on the bridge are protected from vehicular traffic, and also motor vehicles which may break down on the bridge can discharge their passengers onto the sidewalks so that they can leave the bridge for assistance without running the risk of being hit by other motor vehicles.

Erection of Highway Bridge

The two main piers of this structure are carried to Elev. –150 feet mean Gulf level while the end piers are carried to a depth of Elev. –10 feet mean Gulf level and are supported on piles. The two main center piers were carried down by the open-caisson method, the caissons being lenticular in shape and having one circular dredging well in the center. The two end piers were constructed in cofferdams of steel sheet piles.

Each of the three spans, beginning with the easterly span, was erected on timber falsework at the west end of the bridge. When they were completely assembled, two outriggers were attached on each side of the span, these outriggers being carried out and braced from the bottom chord so that large steel barges could be floated under them when the barges carried considerable water ballast. Two barges were used for floating each span. In order to make possible the use of the barges, channels had to be

(*Concluded on page* 27)

Graders and scrapers at work on Fredericksen & Westbrook's highway contract on U. S. 40 west of Lovelock, Nevada.

C. & E. M. Photo
The rented Allis-Chalmers power grader mixing crushed gravel and Tarvia.

Town Roads Improved With Gravel Mixture

Old Surface-Treated Roads Resurfaced with Road-Mixed Gravel from Town Pit in Middleboro, Mass.

✦ THE improvement of 2 miles of old gravel roads in different sections was accomplished by the Town of Middleboro, Mass., last summer at a cost of between $1,800 and $2,000 a mile of 18-foot surface. These old gravel roads had had nothing done to them for about 7 years when the State had used them as a detour, oiling and scraping them regularly. But even with scraping the roads were greatly in need of a good surface suitable for secondary highways.

As part of the Town's improvement project, the road was straightened and a number of kinks removed, but practically no additional gravel was needed for the base as it had been maintained in the regular annual program.

Preparation for Road-Mix

The road to be resurfaced was scarified to a depth of about 5 inches with the Town's 15-ton Buffalo-Springfield 3-wheel steam roller. The base was then reshaped, rolled and thoroughly waterbound, following which it was planed by an Adams patrol grader, pulled by a truck, until the base was dry and thoroughly compacted. A tack coat of ¼ gallon per square yard of Tarvia B was then applied to the road 18 feet wide. This was the width of the finished surface, as it has little heavy commercial traffic or wide vehicles using it.

Immediately following the tack coat, the road was closed for about 2 hours to allow the tar to penetrate the surface, then it was sanded lightly by hand from a truck to prevent pick-up by traffic. Traffic was allowed to use the road from two to three weeks, depending on the weather, while the tack coat was thor-

(*Concluded on page* 39)

C. & E. M. Photo
Method of supporting the lower chord of the railroad bridge on mud sills and large steel wedge jacks during erection of one of the Wax Lake Outlet bridges.

U. S. Route In Nevada Widened and Improved

Time Studies Made of Hauling Units Used by Fredericksen & Westbrook On 17-Mile Project Near Lovelock

(*Photos on page* 48)

✦ IN accordance with its program of highway improvement, the Nevada Department of Highways last year awarded a contract for the reconstruction to a higher standard of a 17-mile stretch of U. S. 40 extending west from Lovelock, Nevada. The original construction consisted of a 24-foot roadway with an 18-foot road-mix asphaltic surface. Under the contract awarded to Fredericksen & Westbrook of Sacramento, Calif., for $262,637.67, the highway was reconstructed to a 38-foot roadway width with a 24-foot plant-mix asphaltic surface and 7-foot road-mix asphaltic shoulders. Work was commenced in September, 1939, and the grading and first base course were completed. Shortly thereafter winter weather required a suspension of work which was resumed the following spring and the job was completed July 4, 1940.

The major items of work consisted of 151,809 cubic yards of roadway excavation; 132,000 tons of Type 1 gravel base; 56,000 tons of Type 2 gravel base; 3,000 tons of liquid asphalt; and 32,248 tons of plant-mix bituminous surface.

Grading

This stretch of highway lies in the Humboldt Valley, in flat terrain, and the grading was handled by scrapers and motor graders. Fill for the subgrade was hauled by two 12-yard Carryalls pulled by D8 diesel tractors and was spread by three Caterpillar No. 12 motor graders and one No. 11 Auto Patrol. A diesel D6 tractor equipped with a bulldozer and a LeTourneau 3-yard bottomless scraper handled clean-up and sloping of fill banks.

Three D8 diesel tractors with 20-yard Carryalls hauled material from a roadside borrow pit to the road grade, with a D8 tractor and LeTourneau bulldozer acting as a pusher in the loading pit. The fill was spread by a D6 and LeTourneau bulldozer and compacted by a sheepsfoot roller.

Some interesting time studies were made of the 20-yard units hauling from the borrow pit to the highway grade. The scrapers carried an average of 22 yards of soft sand and gravel, a material which was extremely hard to load as it is not live. The traveling distance from one end of the borrow pit to the extreme edge of the fill was 3,688 feet, of which 400 feet was loading, 3,168 feet hauling, and 100 feet unloading.

(*Concluded on page* 29)

Virginia removes BOTTLENECKS *from U.S. Highway No. 1*

1 A Texaco Asphalt wedge course is constructed to bring the widened concrete pavement to the desired contour.

2. The 1½-inch binder course has been laid on two of the highway's three lanes. Note traffic using the binder.

3. The 1-inch Sheet Asphalt wearing surface has been laid on the left.

From northern Maine, U.S. Highway No. 1 stretches south through fourteen States to Miami, Fla. It carries a heavy tourist traffic to famous resorts all along the Atlantic seaboard.

Two 18-foot-wide links in U.S. No. 1, between Petersburg and South Hill, Va., were acting as bottlenecks to traffic and the Virginia State Highway Department decided this year to eliminate them.

For 16 miles, the worn, narrow concrete highway was widened out to 30 feet. A resilient, heavy-duty TEXACO Sheet Asphalt pavement, consisting of 1½-inch binder course and 1-inch wearing surface, was then laid over the full width of the expanded route. The accompanying photographs show the process step by step.

Today, Sheet Asphalt, highest type of asphalt street and highway construction, serves a large and steadily increasing mileage of the Virginia State Highway System.

To assist you in choosing the most suitable and economical type of Asphalt surface for highway, street or airport runway, take advantage of the wide experience of Texaco engineers. A request to our nearest office will bring one of them to you, without obligation.

4. Virginia has eliminated another bottleneck in U.S. Highway No. 1. The TEXACO Sheet Asphalt pavement was laid by the Virginia Asphalt Paving Company.

TEXACO ASPHALT

THE TEXAS COMPANY, Asphalt Sales Dept., 135 East 42nd Street, New York City

Chicago Philadelphia Houston Richmond Jacksonville Boston

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Highways and the Defense Effort

Last February John M. Carmody, Federal Works Administrator, submitted to the President a report compiled by the Public Roads Administration, recommending an appropriation of $287,000,000 to take care of immediate needs of the strategic network of highways. This report has been buried on the President's desk until last month, when he asked Congress for an appropriation of $125,000,000 for necessary work on highways and bridges.

During that same period of time, the President has made several public statements concerning the complete all-out defense effort to be made by this country. He has indicated that every one of the 130,000,000 of us has a part to play and a contribution to make to total defense. With this we heartily agree, and as pointed out in our article on National Defense in the January issue of CONTRACTORS AND ENGINEERS MONTHLY, the road builders of America are organized, ready and eager to make the great contribution which lies in their power to make. They are waiting only for the green light.

A survey of the status of our highway system, published in the March issue of CONTRACTORS AND ENGINEERS MONTHLY, indicates that necessary work on the highways and bridges included in the strategic network would amount to about $1,200,000,000 and $100,000,000 respectively. The American Association of State Highway Officials has reported that urgent needs on the state highways would total $3,664,296,000. In the face of these facts, the President asks for $125,000,000!

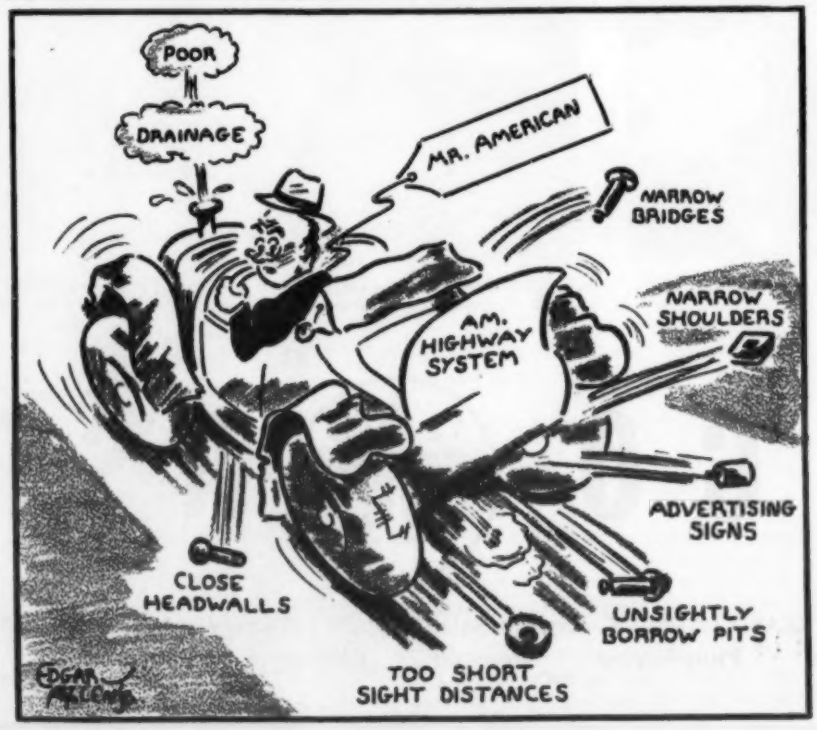
Apparently he expects the state highway departments to finance a large share of the necessary work. But this burden can not be carried by the state highway departments alone. In the first place, the states will this year spend about $210,585,000 on maintenance of the present highway system, an expenditure equally vital to defense. In the second place, it is impossible for the states to spend their Federal-Aid allotments on much of the needed highway work, such as access roads, because Federal Aid must, by law, be spent on the Federal highway system and most of the access roads are not included in any major highway system. The President's request would indicate a complete lack of understanding of our highway needs and of the place of highways in the defense of this country *and* its preparations for defense.

Fortunately we have in Congress two leaders in highway matters, Senator Hayden and Representative Cartwright, whose understanding of the problem is rather closer to reality. Ignoring the President's recommendations, legislation has been introduced raising the appropriation to at least $250,000,000. At this writing final action has not been taken. But we can be grateful for two such exponents of good roads, and hope that the importance of highways in the defense effort will be realized by other members of the Administration before it is too late.

At no time in the fostering of the program for better roads and more adequate transportation facilities in this country through an improved highway system has the highway program been tied to the defense kite as a means of getting more money for roads. The war in Europe has proved the absolute need for more adequate highways for the motorized transport of troops either in trucks or as motorcycle divisions. If these United States of America are to act as a complete unit in defense, they must be linked with a system of highways over which the heavy trucks and armored cars and tanks can roll at their most effective speeds without stopping for the strengthening of bridges, or the widening of narrow roads so that the big guns can get through. They must be able to get through on any road in the country and particularly along the coasts and the borders where a deliberate blow might well be delivered by a foreign enemy. Mired motor divisions don't win battles! Hard surfaces, wide shoulders for getting disabled vehicles out of the way, and bridges that will carry military machines are vital parts of the defense of the country.

Mr. President, stop and consider the money you are spending for equipment for motorized defense. Will it run on our highways and can it turn the sharp corners onto some of the narrow bridges on our Federal Aid roads? The unhappy answer is "No", and it is the responsibility of the Administration to see that the proper action is sponsored for financing the needed highway construction.

TOO MANY WRONG PARTS



Further Discussion On Soil Compaction

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

Your article in the June issue covering the A. R. B. A. Committee report on observed phenomena and economies possible in soil compaction affords an opportunity for the contractor, the engineer, and the equipment manufacturer to meet on common ground and to allow each to have his say. I for one should like to make some remarks, not necessarily representative of engineers, but as an engineer who has been primarily interested in soils research.

The report is a milestone—perhaps we should say it is only the first milestone—in that a very concerted attempt has been made really to analyze and explain all the varied and complex processes involved in soil compaction. But in spite of the attempts made to explain the processes, the information is of a very general nature. It would, of course, be almost impossible to give any specific information which would apply in more than a very limited number of cases because of the large number and complexity of the variables entering into the subject.

The engineer is interested in getting as dense a fill as possible for many reasons. A dense soil has a higher shear strength than a loose uncompacted soil. It is thus possible by compaction to make a more stable fill and to utilize steeper slopes. A compacted fill will give less total settlement and less differential settlement due to un-uniformities in soil characteristics. A compacted fill will have greater bearing capacity under concentrated surface loads. However, the densest possible fill may be very uneconomical to obtain and may be quite unnecessary in a particular case. A careful study of the required stability, allowable settlement, and bearing capacity needed, coupled with soil tests of shear strength, consolidation characteristics and compressive strength of the soils in question at different densities and moisture content, would lead to a safe value of density and the deviations from optimum moisture content which can be allowed.

"Don't get sunburned—you're the best roller man we've got!"

In making field tests on different types of rolling equipment, different soils and different moisture content, the type of roller found best for one soil and one fixed set of conditions may be entirely the wrong type of roller for the same soil under only very slightly different conditions. One must therefore be very reluctant about blindly using a method found successful on one job on another job even under somewhat similar conditions.

In a particular case at hand, a section of fill in a dam was compacted with a 250-pound per square inch sheepsfoot roller and with one exerting over 500 pounds per square inch. It was found in this particular case that, with the light roller, the moisture content had to be very carefully controlled and the fill well mixed in order to get uniform density. With the heavier roller, greater densities were obtained, the density remained uniform over a wide range of moisture content, and no mixing was necessary. Furthermore, it was found that even the hauling equipment alone was more effective in compacting the fill than the lighter roller. With a different soil, the above results might have been reversed and the lighter roller found the more desirable.

The above remarks certainly point to the fact that not nearly enough is known about soil compaction to specify a certain method and a certain set of equipment for any one job without some kind of tests, both field and laboratory. A large and long-time research program, aimed at getting to the basic phenomena occurring during compaction, coupled with a careful study and correlation of the large amount of field data available, would be a big step towards getting a more rational and scientific approach to the problem of soil compaction.

Very sincerely yours,
J. O. Osterberg,
Vicksburg, Miss.

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

We desire to compliment you on the article on methods of earth compaction in your June issue, as it certainly has a great deal of information and is very helpful in pointing out the problems of soil compaction.

We should like to make the following comments on that portion of your article relating to the effect of pneumatic tires. We have long felt that good compaction of material could be attained by the use of earth-hauling units equipped with large-section large-diameter pneumatic tires operated at low air pressures. We were glad to learn that our opinion on this has been substantiated by the findings of the A. R. B. A. Committee investigating this subject.

We noted a reference to the study of an 18.00-24 tire carrying 60-pound inflation pressure. There are some operations where these high inflation pressures are practical, but ordinarily when we recommend tires for earth hauling units, we consider 35 to 40 pounds inflation

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U. S. Firms Invited to Exhibit at Road Congress

The Organizing Committee of the Fourth Pan American Highway Congress, to be held in Mexico City, September 15-24, 1941, has extended an invitation to manufacturers of highway equipment and materials in the United States to participate in the highway exposition which will be held in conjunction with the Congress. Every inducement to exhibit is being offered by providing free exhibit space, special railroad rates, and special rates for manufacturers' representatives.

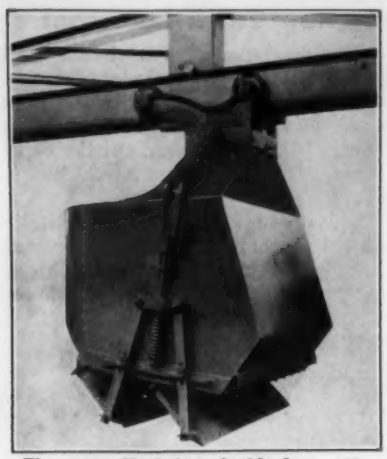
The Pan American Highway Congress will be attended by delegates from each of the Latin American countries, and this exposition will provide manufacturers of American road-building equipment an opportunity to meet the highway officials of Central and South America. In addition, it will enable these highway engineers to become better acquainted with American-made equipment. In the past, a large amount of highway equipment used in these countries came from Europe. With that source of supply now closed to them, it is pointed out by the American Road Builders' Assn. that this is a good opportunity for American manufacturers of road-building equipment to establish this market for equipment manufactured in this country.

Do your share for National Defense. Buy Defense Bonds and Stamps.

New Track Lubricant

The development of a viscous track roller lubricant for crawler-type tractors, which is also suitable for army tanks of similar mechanism, is announced by the Standard Oil Co. of Indiana, 910 So. Michigan Ave., Chicago, Ill.

This new product protects against dirt and other contaminants, it is reported, has high resistance to water, and a consumption rate 20 to 25 per cent lower.



The new Koehring double-door concrete paver bucket.

Double-Door Bucket New Paver Feature

The new Koehring double-door paver bucket, recently announced by the Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis., for its line of 34-E single-drum and Twinbatch concrete pavers, is designed for faster dumping, more efficient spreading and the elimination of clogging, especially where stiff concrete is specified.

The two-door arrangement makes possible buckets which are wider and shallower at the bottom. The two doors open in the same direction across the full width of the bucket bottom, thus providing two simultaneous spreading actions instead of one. Because of this feature, the manufacturer states that stiff concrete will not pile up at the opening, so that a full batch is easily handled by this type of bucket and, in addition, because of the dual dumping and spreading action, the bucket is emptied more quickly.

Further information on these new Koehring double-door paver buckets may be secured direct from the manufacturer by mentioning this item.

Hose Couplings

One of the features of GJ-Boss hose couplings, made by the Dixon Valve & Coupling Co., Philadelphia, Penna., is the ground joint union eliminating shutdowns to replace worn washers. The carefully rounded head of the stem fits exactly against the copper insert in the spud, forming a soft-to-hard metal seal which is leak-proof under all conditions of service, according to the manufacturer.

Style X-34, consisting of the stem, wing nut, female spud and clamp, is designed for use under high or low pressures on steam, air or water hose. The 1-inch and larger sizes are furnished with the four-bolt Boss Offset interlocking clamp, while the ¾-inch and smaller sizes have a two-bolt interlocking clamp. Sizes range from ½ to 4 inches inclusive.

The Boss Offset interlocking clamp, which is a feature of these couplings, has the bolt lugs and dovetailing fingers set in staggered, or offset, relation to each other. This design causes the clamp to grip evenly and securely the entire circumference of the hose. The forward gripping ridges are at right angles to the hose, while those on the rear portion of the clamp are spirally shaped to fit over the spirals when used on wire wound hose.

Further information on GJ-Boss couplings, as well as on the many other styles of hose couplings made by this company, is contained in literature which may be secured direct from the manufacturer by referring to this item.

Smith Engineering Works Appoints New Dist. Mgr.

Announcement has been made by the Smith Engineering Works, Milwaukee, Wis., manufacturer of Telsmith crushers and equipment for quarries and sand and gravel plants, of the appointment of Harry Buckenheu as its New York District Manager. Mr. Buckenheu, who has been associated with the sand and gravel and crushed stone industry for a number of years, will be located at Room 1604, 50 East 42nd St., New York City, and his territory will include all of New York State, northern New Jersey and southern Connecticut.

Pneumatic Rollers For Belt Conveyors

A new pneumatic roller for carriers on belt conveyors wherever the shocks of impact are excessive has recently been announced by the Stephens-Adamson Mfg. Co., Aurora, Ill., maker of S-A belt conveyors and bucket elevators. These pneumatic carriers are especially designed for use under loading spouts and in belt feeders where the impact of heavy bulk loads subject both conveyor belt and carrier to abnormal strains and wear.

To cushion the impact of materials and thereby prolong conveyor belt life,

The new S-A pneumatic roller for belt-conveyor carriers.

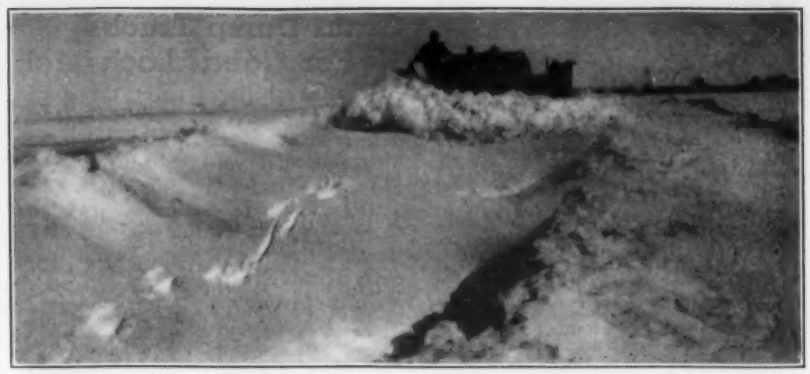
the rollers in these carriers are made up of a series of pneumatic rubber units, 6 inches in diameter, similar to miniature automobile tires. These rollers are mounted on the steel hub in the carriers in which the bearings and shaft are housed. The roller units have thick wear-resisting treads and are inflated and permanently sealed to prevent loss of air. The assembly is built for easy servicing and quick replacement of damaged units.

Further information on these Style No. 711 pneumatic impact carriers may be secured by interested contractors and engineers direct from the manufacturer by mentioning this item.

Snow Removal Aids Spring Maintenance

North Dakota Devotes Last Weeks of Winter to Preparation for Spring; Foresight Pays

By THEODORE T. LOY, Division Maintenance Engineer, North Dakota State Highway Department



The accumulation of North Dakota's frequent and deep snowfalls must be properly handled to prevent serious damage to the roads during the spring break-up.

✦ THE spring break-up puts every employee of the North Dakota State Highway Department on the alert for possible damage to the section of highway assigned to him. North Dakota winters are long and extremely cold, but when winter ends the temperature may rise from a daily average of 5 degrees above zero to 65 above in a few hours. This means that we must be prepared when the thaw comes.

The snow-removal activities in the last few weeks of winter are all organized and directed toward this end. Drifts are plowed and snow thrown back as far as possible by small fast V and one-way plows. Vertical banks are cut down by heavy winged truck plows. The snow is removed well past the shoulder line in order to provide adequate waterways for the fast-melting snow.

Extra men are hired in local areas to assist and augment the services of the high-pressure steam boilers used to keep small structures and culverts free from ice if the temperature drops. Frequently a few mild days are followed by another week of zero weather, and this alternate intense change in temperature may be repeated several times before the winter accumulation of snow is finally reduced to water.

Plowing beyond the shoulders while the ground is still frozen is of utmost importance. Power patrols are used on in-slopes to undercut drifts which may have become too dense for removal by truck plows. Frequently the desired results can be obtained by applying the heel of the blade to the in-slopes and compacting the snow to open a drainage channel. On other occasions, we have had considerable success by hitching two trucks in tandem, the fore truck furnishing the traction and the outside wheels of the heavily loaded aft truck held on a line several feet outside the shoulder line. This process is fast, but can become dangerous if delayed until the frost is coming out of the ground. Continual surveillance and vigorous activity is everywhere in evidence during this critical period.

The total mileage in the Minot Division is 954.9, of which 52.7 miles are earth, 652.7 gravel, 167.0 oil mix, and 82.5 miscellaneous hard surfacing, consisting of penetration oil and tar. First consideration is given to the higher types of surfaces for the obvious reason that here is where the greater investment lies.

Topography

The topography of the division falls into four sections: the Turtle Mountains, the central plain, the rolling plain, and the severely eroded Missouri River area. The eastern corner of the division lies adjacent to the Turtle Mountains which is the highest land, having a maximum elevation of approximately 2,300 feet. Their topography is that of an eroded plateau, moderately to strongly rolling, with numerous potholes and small lakes resulting from glaciation.

To the west, southwest and south of the Turtle Mountains is an extensive plain extending beyond the western boundary of the division. Its topography is almost level to gently undulating, except where drainageways or isolated hills give a rougher relief. This plain slopes gently to the east, the elevation at Kenmare being about 1,800 feet and at Towner and Willow City about 1,500 feet. The eastern part of the plain was occupied by the glacial lake Souris. Large areas of sand dunes are found in the east central portion of the division in what was once the lake bed.

The third section is the slightly elevated steeply rolling area extending from Minot to the west, southwest and south. A high-quality lignite coal underlies a large portion of this area, which is now being mined in ever-increasing commercial proportions. In this area are numerous blind meandering depressions which act largely as water harbors.

The Souris or Mouse River is the major drainageway. Rising in Canada, it enters the division in the northwest corner, makes a big loop down through

(*Concluded on page* 34)

The Blaw-Knox truck turntable.

Turntable Speeds Truck Movements

With speed the keynote of current construction, particularly on National Defense projects, any equipment which speeds up operations is of particular interest to contractors and engineers. One of these short cuts is the recently improved Blaw-Knox truck turntable which permits trucks to turn around quickly and easily in restricted areas.

The turning mechanism of these new units consists of a circular pan or sled, on which the whole table turns. Both single and double-end turntables are available, in capacities up to 27 tons gross load, and one man can turn a loaded table. Ramps are furnished with the single-end models and are attached at one end, with a bumper rail provided at the opposite end. One model of the single-end turntable includes a hinged ramp. Steel ramps for each end of the double-end turntables are available if desired, or the user can build his own ramps of wood from detail drawings furnished by the Blaw-Knox Co., Pittsburgh, Penna., manufacturer of these turntables.

Copies of Bulletin 1822 describing these new turntables, some of which are already in use in the construction of naval bases and in tunnels as well as on road jobs, may be secured by those interested direct from the manufacturer.

Promotions at Link-Belt

Link-Belt Co., Chicago, Ill., announced recently the appointment of Laurence M. Ewell as General Manager of eastern division operations, with headquarters in Philadelphia. Mr. Ewell was formerly Export Manager and Manager of the company's New York office, and will be succeeded in that position by his assistant, Carl A. Woerwag.

Giant Dump Trucks For Canal Locks Job

What are believed to be the largest orders for dump trucks ever placed, both from the standpoint of dollar volume and total yardage capacity, have just been awarded to the Mack-International Motor Truck Corp., Long Island City, N. Y. The two orders, placed by Panama Constructors and Martin Wunderlich-Okes Construction Co., who have large excavating contracts for the long-planned third set of locks at the Panama Canal, call for a total of 69 big super-duty Mack dump trucks and amount to well over $1,000,000.

The order from Panama Constructors is for 53 trucks, 40 of which will be huge six-wheel dumpers of 25-yard capacity, while the 16 for Wunderlich-Okes will also be six-wheel models, with drive on all six wheels. The total capacity of the 69 trucks is 1,342 cubic yards. It is stated that, working 22.5 hours a day and averaging six trips an hour, they will have a total daily capacity of about 180,000 cubic yards.

The excavation for the third set of locks for the Canal is probably the largest project of its kind ever attempted with power shovels and trucks, involving the removal of over 50,000,000 cubic yards of earth and rock. Officially this giant undertaking is known as the Panama Canal Third Locks Project, and close to $275,000,000 will be spent by the U. S. Government for its completion. These new locks will increase the capacity of the Panama Canal, providing for the handling of the largest passenger and battleships afloat, and are considered a vital part of our National Defense Program. It is estimated that three and a half years will be required for their completion.

Panama Constructors has the contract for the Miraflores and Pedro Miguel third locks excavation on the Pacific side of the Canal, while Wunderlich-Okes will handle the excavation for the third set of locks connecting Gatun Lake and the Caribbean Sea on the Atlantic side of the Isthmus.

The Inter-American Highway; From a Dream to a Reality

Increased Interest in Central America and Importance to U. S. Will Stimulate Work on Route

By E. W. JAMES, Chief, Inter-American Regional Office, Public Roads Administration, U. S. Federal Works Agency

✦ A PAN AMERICAN Highway connecting the capital cities of all the continental American republics is an active project today in which many of the Central and South American governments are deeply interested. Each year of the past decade this interest has widened and taken a more definite and constructive form. It is a simple matter to collect data and plan; it is an altogether different problem to secure funds to carry out the plans. Road construction with funds locally secured has increased at a fairly steady rate during recent years everywhere in Latin America, an indication of the increased general interest.

In this truly magnificent conception of a Pan American system of highways, the particular interest of the United States is clearly in that section lying between the Rio Grande and the Panama Canal. Undoubted economic benefits for all the American republics will result from progressive construction of highways, especially those of an international character. Such construction will improve transportation conditions within and between the various countries and the United States; increased local employment will be furnished and the national economic structures supported against the debilitating effects of strongly adverse exchange conditions; new lands will be opened to development, and new natural resources will be brought within reach of local and export markets, with the normal result of increasing the consumption of American imports, including American-made automobiles and trucks, spare parts, garage equipment, as well as road-building equipment and materials.

Importance to U. S.

In all of these advantages the United States would have a common interest with the other countries. In addition, we can not fail to recognize certain defense values inherent in overland communication between the United States and Panama. Such communication does not exist today. Only two or three common frontiers can be crossed with reasonable ease or convenience. The possible use of the highway as a line on which to string emergency airports, flight strips, or other commercial or defense facilities gives the project a special interest to this country.

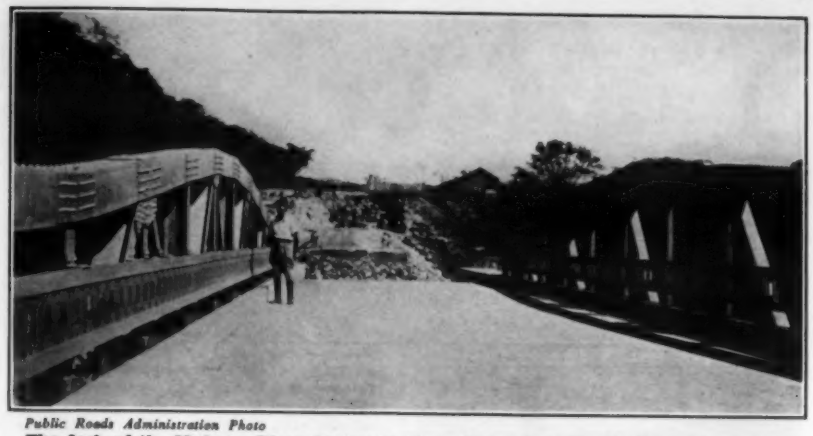
The proposed highway obviously would tie together the Panama Canal and any future canal at Nicaragua. In the event the second canal is ever constructed, such intercommunication by railroad or highway will be imperative and a right-of-way must exist.

Reconnaissance Surveys

In 1930 the United States Congress made an appropriation of $50,000 for a reconnaissance survey to determine a feasible route for an Inter-American highway from the United States through Panama to South America.

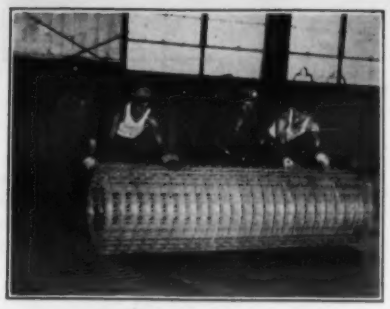
As this appropriation had been authorized the preceding year, it had been possible to consult the other countries concerned and determine with considerable exactness what terms of cooperation had best be adopted in order to expedite the work. In general, the other countries agreed to furnish the necessary transportation within their respective areas and local engineers to accompany and cooperate with the engineers assigned from the United States to conduct a reconnaissance survey. Surveys in the several countries from Panama through Guatemala were made without essential variation from this form of

(*Continued on page* 30)



Public Roads Administration Photo

The deck of the Maderas River Bridge in Nicaragua and, in the background, work on one of the approaches.



C. & E. M. Photos

At left, unrolling the heavy steel reinforcing fabric over the waterproof subgrade paper before pouring and striking off the slab in Hangar No. 7, Westover Field, as shown above.

Truck-Mixed Concrete Used for Hangar Floors

(*Continued from page* 1)

roller and then 8-foot wide strips of heavy double kraft paper, waterproofed with asphalt between the two sheets, was laid transversely across the 20-foot-wide strips to prevent loss of water. Standard 6-inch steel forms were used for the initial slabs which were poured alternately.

Steel fabric reinforcing of 6-gage wire and a 4 x 4-inch mesh and lapped 4 inches was spread over the waterproof paper prior to pouring the concrete.

Base Concrete

The paving of the inside of one hangar required ten 20-foot strips with a 4½-inch strip at the outside, adjacent to the lean-to's. A day's job was the pouring of two strips of concrete 20 feet wide and 6 inches thick, including 5½ inches of 1: 2: 4 concrete reinforced with the wire mesh and a ½-inch topping course. Work was started at 1 a.m. pouring base concrete, and the whole job, including the topping, was finished by 8 p.m. with the finishers working a full 12 hours starting at 8 a.m.

The 1: 2: 4 base concrete has sand and crushed trap rock from ¼ to ¾-inch screen size mixed for a slump of 1½ inches. The concrete was batched at the Blaw-Knox plant of P. J. Keating of Fitchburg, Mass., located just outside the reservation, capable of batching material for 35 yards of concrete per hour. The concrete was dry-batched to a fleet of five 4-yard Rex truck mixers mounted on International trucks. To deliver the mixed concrete, the truck mixers backed into the hangar on the subgrade of an unpaved strip and delivered the concrete to a 1¼-yard Blaw-Knox rollergate bucket swung by a Lorain 75A crawler crane with a 40-foot boom. The bucket was swung to where the concrete was needed, dumped, and the concrete distributed by six pit men with shovels. The concrete was then struck off even with the top of the forms, or in case the adjacent slabs had been poured, even with the tops of the slabs, by four men pulling a 22-foot screed transversely, and two men pulling it forward with rods hooked to the screed. The concrete along the edges adjacent to the forms, or to previously poured slabs, was vibrated to insure a dense concrete free of honeycomb. Immediately thereafter, the freshly screeded concrete was compacted by pulling a hand roller, giving a pressure of 16 pounds per square inch, over the entire surface. This compacted the entire mass of base concrete the ½-inch necessary for the placing of the specified topping.

An expansion joint of ½-inch thick asphaltic material was placed around the entire perimeter of the concrete paving in the structure and through the center line in both directions. Every 40 feet in the 20-foot paving strips, a transverse construction joint was cut down 2 inches into the concrete, through the topping and base, while the concrete was still green. At every second slab on either side of the front-to-back center line of the hangar, smooth, round thoroughly greased ½-inch dowels 3 feet long were placed in the concrete on 3-foot centers, to prevent the slabs getting out of line vertically. At all other joints similar deformed dowels were placed but not greased. At the joints where the smooth dowels were used, dummy joints 1-inch deep were cut between the slabs. The tooled joints on both sides of each slab, and at the construction joints, are ¼-inch radius.

Topping

The concrete for the ½-inch of applied topping is composed of a 1: 1½: 1½ mix with a maximum of ¼-inch aggregate and a maximum slump of 4 inches. The topping was placed when the green rolled concrete would readily bear the weight of men walking on it, which was at about the time that water had disappeared from the surface. The method of delivering the topping was identical with the placing of the base

(*Concluded on next page*)

Paving Hangar Floors At Westover Air Base

(Continued from preceding page)

except when the number of strips to be completed was greatly reduced and then the truck mixers delivered the topping mix at the entrance to the hangar and three concrete buggies were used to move the material to the section where the material was being poured.

The top material was spread in the same manner as the base, and as soon as it had set up slightly, Kelley Compactor and Power Floats were used to give the initial finish to the surface. Following this initial floating a 10-foot screed, or straight-edge, was used to check the surface, following which it was floated again except in hot dry weather when the material set up too fast to permit this ahead of the hand finishing.

Following the power-floating, six hand finishers worked over the surface with wood floats and steel trowels. Following this initial hand-finishing operation, two further steel trowelings were given to the surface, the last one of which produced a burnished surface of high density. The hand edging of the topping was done just ahead of the first power floating and then was touched up following it, if necessary.

Hose Bibs and Ground Plugs

There are six service pits in the floor of each hangar which contain connections for air lines and hose bibs. In addition, because of the amount of static electricity generated in a hangar, there

C. & E. M. Photos

Top, one of the three Kelley Power Floats giving the initial finish to the topping of the concrete floor. The final operation, shown in lower photo, was hand finishing with wood floats and steel trowels.

are 42 grounding plugs in the floor of each hangar. These are brass tubes with cups at the top for the covers, and the tubes are grounded to the steel tie rods of the arched girders. In this way any static electricity is arrested and is dissipated through the entire structure. At first it was intended merely to drive copper rods into the soil beneath the hangar to furnish this grounding, but it was found that the ground water was so pure that it would not act satisfactorily as a ground for the rods.

Personnel

The construction of Westover Field near Chicopee Falls, Mass., for the U. S. Army, is being carried on under the jurisdiction of Lt.-Col. Harley Latson, District Engineer, U. S. Engineer Department, Providence, R. I., with Carl H. Lovejoy as Area Engineer, Malcolm R. Gilpin, Jr., Assistant Area Engineer, Fred Skidmore, Field Engineer, and Judson H. White, Chief Inspector of Hangar Operations. J. B. Mapes is General Superintendent for The Tuller Construction Co. of Red Bank, N. J., general contractor for the construction of the Base. The paving of the hangar floors was done by the general contractor, with concrete furnished by P. J. Keating of Fitchburg, Mass.

New Electric Hand Saw

A new addition to its line of Speedmatic saws has recently been announced by the Porter-Cable Machine Co., Syracuse, N.Y. This new Type K-65 electric hand saw carries a 6½-inch diameter blade, with a cutting capacity of 2-inch material, and weighs only 15½ pounds. The blade travels at 7,200 rpm, producing a cutting edge speed of more than 2 miles a minute, according to the manufacturer.

It is stated that through the use of a helical cut gear drive, 98 per cent of the motor power is transmitted to the drive shaft. Power is furnished by a ⅝-hp Universal motor. The base of the machine raises or lowers for depth adjustment, and tilts to 45 degrees for bevels. A cast-in enameled graduated scale affords quick and accurate setting, and the frame is of die-cast aluminum. Standard equipment includes a combination saw blade, ripping guide, cross cutting guide, 15 feet of insulated conductor cable with plug and socket, a metal carrying case, and a blade change wrench.

Further information on the Type K-65 Speedmatic saws as well as other saws in the Speedmatic line may be secured direct from the manufacturer.

Wellpoint System Used in Dam Work

Arkabutla Dam Outlet Excavated in Pre-drained Area in Two Stages on Headwaters of Yazoo River

✦ AS a part of the general plan for flood control in the Yazoo Basin, the U. S. Engineer Department awarded a contract on July 6, 1940, for the construction of an earth-fill dam on the Coldwater River, a tributary of the Yazoo River, in the northwestern part of Mississippi, not far from Sardis Dam (see C. & E.M., April, 1938, pg. 2), in Tate and DeSoto Counties about 7 miles northeast of Pritchard, Mississippi. The dam, known as Arkabutla Dam, is to be a rolled earth embankment about 10,000 feet long, 65 feet high above the valley floor, and 40 feet wide at the top.

The outlet structure, with approach and appurtenances, is about 900 feet in length, with the subgrade elevation varying from 169 to 159. Outlet control is of the gate type, constructed near the old stream channel, and there is to be a chute-type spillway built through a ridge adjacent to the north abutment. Ground-water elevation at the site of the outlet structure rises to approximately Elev. 195, when the impervious top stratum is removed from the underlying sand, requiring a lowering of the water table a maximum of 36 feet to permit excavation of the outlet structure area in the dry.

Wellpoint System

The contractor made an initial installation of a Griffin wellpoint system along the outlet conduit site at Elev. 185 for a distance of about 400 feet after the excavation had been lowered about 15 feet. Pumping was started on this section and the water level lowered to approximately Elev. 169. The wellpoint system consists of 7 Griffin Vac-U-Matic 10 x 8-inch 2,500-gpm wellpoint pumps powered by Waukesha engines, 332 Griffin Jet'N Drive wellpoints with 20-foot x 1½-inch risers and swing joints, 1,600 feet of 8-inch header line with inlets at 2-foot centers, and 600 feet of 8-inch discharge line, complete with gate valves, fittings and 2-bolt couplings.

Following the initial wellpoint installation, the second-stage line of wellpoints was then installed for about 600 feet on the opposite side of the extended excavation. This brought the installation to the position shown in the photograph, with the system installed on both sides at about Elev. 185 and the original water table lowered to below Elev. 169. The wellpoint drainage system now extends for 650 feet on each side.

The second-stage wellpoint installation at Arkabutla Dam in Mississippi, showing a bulldozer operating in the dry 26 feet below original ground water level.

As the work is completed, the system will be dismantled at the rear and reinstalled ahead at a lower elevation, similar to the usual practice for progress on sewer jobs. Ultimately the header and pumps will be at Elev. 175 to predrain for the maximum excavation for subgrade at Elev. 159 for the stilling basin wall fittings.

Personnel

The contract for the construction of Arkabutla Dam was awarded to Forcum-James Co., Inc., Pioneer Contracting Co., and H. N. Rodgers & Sons Co., operating as Pioneer & Rodgers, Builders of Arkabutla Dam, Hernando, Mississippi, for $5,158,158. Structure excavation and wellpoint pre-drainage is under the supervision of W. T. Cutchin. The wellpoint system was rented from Griffin Wellpoint Corp., New York City, with the option to purchase, and after having been in operation for about two months following its first installation in October, 1940, the entire system was purchased by the contractor.

The work is being done under the direction of Major S. D. Sturgis, Jr., District Engineer, U. S. Engineer Office, Vicksburg, Mississippi, with R. C. Baker as Resident Engineer for the U.S.E.D. on this job.

New Lubricant Dealers

Extensive changes in the distribution of RPM Delo lubricants have been announced by the New York office of the Standard Oil Co. of California. Hereafter, this diesel-engine lubricating oil can be secured by contractors and state and county highway departments from the following companies:

Lincoln Oil Co., Boston, Mass., serving Maine, New Hampshire, Vermont, eastern Massachusetts and Rhode Island; Davis-Howland Oil Corp., Rochester, N. Y., in upper New York State; New York Lubricating Oil Co., New York City, for the territory including Metropolitan New York, Long Island, New Jersey, Connecticut, western Massachusetts, the Hudson River Valley, and eastern Pennsylvania.

Gordon Lubricating Co., Pittsburgh, will serve the western sections of Pennsylvania and West Virginia; and Autoline Oil Co., Baltimore, Md., will serve Maryland, Delaware, Virginia, eastern West Virginia, and four counties in southern Pennsylvania.

In North and South Carolina, RPM Delo will be handled by the Phoenix Oil Co., Augusta, Ga.; McCarthy Jones & Woodard, Nashville, Tenn., will serve central Tennessee and the Taylor-Hale Machinery Co., of Memphis, western Tennessee.

J. A. Riggs Tractor Co., Little Rock, Ark., will serve the state of Arkansas; and Louisiana Tractor & Machinery Co., of Monroe and Baton Rouge, La., will cover the state of Louisiana.

Preparing Form Lumber

Contractors handling large concrete projects, involving considerable form work, in the defense program, in the construction of bridges, flood walls, dams, and similar structures may be interested in a new folder on a fast and accurate method of pre-cutting lumber by the DeWalt method.

This new folder describes and illustrates how contractors have set up one or more DeWalt saws and put them to work cutting lumber in large quantities, speeding up its preparation by using production methods and decreasing erection time by having the lumber cut accurately in advance.

Copies of this folder Form 1252-41 may be secured by interested contractors direct from the DeWalt Products Corp., 251 Fountain Ave., Lancaster, Penna., by referring to this item.

One of two new concrete breakers.

Concrete Breakers In Two New Styles

Two new pneumatically controlled concrete breakers, designed for breaking out concrete in pavements, trenches, buildings, etc., have recently been announced by the Rapid Pavement Breaker Corp., 607 Degraw St., Brooklyn, N.Y. The 210-cubic foot compressor which supplies air through a 1½-inch hose to the machine may be set up along the roadside or outside of a building and the breaker moved around where needed.

One of the two models is the push type which is handled by three men, one to operate the hammer and two helpers. All four wheels on this machine swivel to allow it to travel in any direction. The unit weighs approximately 1,000 pounds, is 8 feet 6 inches high, 4 feet wide, and 7 feet long. By removing three pins and loosening two bolts, the entire superstructure, including the hammer and cylinder, can be removed from the machine. This breaker can be towed behind any light truck.

The other model, weighing approximately 1,400 pounds, is 8 feet 6 inches high, 7 feet 6 inches wide, and 10 feet long, and requires only two men, the hammer operator and a helper. The running gear is similar to an automobile and it is propelled by an air motor. The boom is longer on this model and is made to swivel, which allows it to cut the width of the front wheels. By removing the braces holding the boom, the boom folds back by a method of ring and worm gear at the base of the boom, permitting it and the hammer to rest on the frame of the machine for transportation from one job to another.

In addition to breaking up concrete, these machines may be used for breaking up frozen ground up to 10 inches and for tamping. Further information is available from the manufacturer.

Generating Plants

Bardco air or water-cooled electric generating plants are available in a wide range of sizes and models to suit any need for electric power on construction jobs or in state or county highway garages.

Air-cooled portable units, providing from 6 to 110 volts direct current or 110-220 volts alternating current, are made in 500, 1,000, 1,500 and 2,000-watt models, while water-cooled generating plants to provide 32, 110 and 220-volt direct current and 110-220-volt alternating current are available in 3,000 and 5,000-watt models. Larger units, from 5 to 200 kw. are made with diesel, gasoline, gas or butane power.

These plants consist of Master generators, made by the Master Electric Co. of Dayton, Ohio, whatever type of power unit desired, and the patented Bardco automatic voltage regulator containing no tubes or moving parts, which regulates all three phases of a three-phase generator and maintains the voltage within plus or minus 3 per cent no load to full load. Safety controls give a visible or audible alarm in the event of overheating of the engine or lowered oil pressure and, if desired, the plants are equipped to stop automatically if such an alarm is not answered within a predetermined period. If it is desired to run several plants in parallel, a Bardco automatic synchronizer is supplied.

Further information on the Bardco plants in 500 to 5,000-watt capacities is contained in Form B-530, while the 5 to 200-kw models are described and illustrated in Form B-520. Either or both of these bulletins may be secured by interested contractors and state and county highway engineers direct from the Bardco Mfg. & Sales Co., Los Angeles, Calif., by mentioning this magazine.

New Shovel-Barrow For Clean-Up Work

The Gar-Bro patented Shovel-Barrow, made by Garlinghouse Bros., 2416 E. 16th St., Los Angeles, Calif., is a combination shovel, scoop and wheelbarrow unit designed for light clean-up jobs in water tunnels, at small stockpiles and similar jobs where fast economical moving of small amounts of materials is required.

The Shovel-Barrow is strongly constructed of 16-gage steel with a reinforced digging edge. The tray or scoop is set in a carrier with a fulcrum-type foot lever which elevates the body and dumps the load when depressed. The wheels are equipped with ball bearings and heavy-duty cushion rubber tires. Model 70 has a tray width of 24 inches, a tray length of 30 inches, and a capacity of 4 cubic feet. Other models are also available.

The Gar-Bro Shovel-Barrow.

The Gar-Bro Shovel-Barrow is described and illustrated in Bulletin No. 57, copies of which may be secured by interested contractors and state and county highway departments direct from the manufacturer by referring to this item.

Choice of Planting For Medial Strips

Clear Marking of Road Edge and Reduction of Headlight Glare Should Be Main Objectives

✦ AN interesting problem in highway safety has arisen on a 5-mile section of U. S. 40 a few miles west of Columbus, Ohio. To improve this route a new 24-foot concrete pavement, with lip curb, was placed parallel to the existing roadway at an offset distance varying from 9 to 11 feet, for use by west-bound traffic from Columbus, leaving the 24-foot width of old bituminous macadam surface to serve the east-bound traffic approaching Columbus.

The separating medial strip, in cross profile, varies from a more or less level graded section to a slope ratio of about 1 on 3 down to the new pavement, as shown in the accompanying diagram illustrating the typical stage-construction procedure for this divided-highway section.

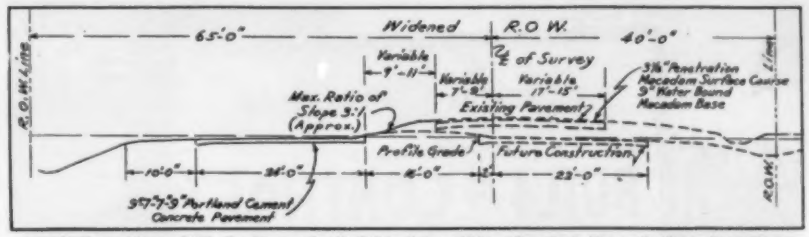
Since this project was completed and opened to travel, it has been found that traffic approaching Columbus over the old road has great difficulty in driving at night due to the headlight glare from opposing traffic traveling over the lower level of concrete pavement. To reduce this hazardous situation, the Department of Highways found it necessary, as an emergency protection, to place high guide posts extending about 4 to 5 feet above the grade of the medial strip. These are 2 x 8-inch in size with the broad face to traffic painted black and white for high visibility. In addition, reflectors were installed on these posts to increase their night visibility.

This guide-post treatment reduced the night-driving difficulties, but the tall striped posts were unattractive and therefore it is considered as a temporary delineation to serve only until the state highway department is able to improve the visibility of the roadway edge, and as far as possible reduce traffic hazards due to headlight glare by appropriate planting.

Problems Involved

Several factors tended to make the headlight glare more difficult for the east-bound traffic to Columbus than for the west-bound traffic from the city. As shown in the cross section, the medial strip along the side of the existing macadam drops away from the surfacing. On those sections where the old macadam is above the new pavement, the sloping surface of the medial strip removes the normal width of shoulder ordinarily provided. The lack of a definite shoulder area thus tends to induce a feeling of inadequate space for high-speed traffic. In daytime driving this is not so important, but at night the inadequately defined roadway edge automatically handicaps the driver in the operation of a motor vehicle.

There is another factor which also tends to contribute to this tension in driving. Traffic approaching Columbus may be considered as the faster moving traffic, because it is approaching the city from the country where it has accommodated itself to higher driving speed over longer travel distance than the outward-bound traffic from the city. The lack of delineation upon which the traffic depended before it reached the divided section is therefore more serious for the driver approaching Columbus. Drivers leaving the city are operating under less driving strain, as they have just left the more confining and congested city traffic and the open country is a contrasting form of relief.



Typical section of U. S. 40 west of Columbus, Ohio, showing the relative elevations for the east-bound and west-bound traffic lanes.

For traffic leaving the city, the type of construction is definitely designed to make driving less hazardous. The lip curb of the new concrete pavement offers a more definite edge than the old macadam surfacing. Also the medial strip as viewed by these drivers rises to meet the headlamp rays and thus further helps to define the edge.

Planting a Solution

The usual suggestion to counteract headlight glare is the planting of low-headed trees or a dense hedgerow of shrubs in the medial strip to intercept the opposing light rays, especially at points of curvature. Since traffic, in an emergency, is free to leave the traveled way and thus may run into and damage any planting within the separation area, it is most important that great care be used in solving the problem by planting.

For instance, an unprotected hedge of shrubs would be subject to occasional or even frequent destruction, especially in winter when ice and sleet are an added hazard. This means that a good deal of

(*Concluded on page* 40)

Signs such as this are the first step in the Associated General Contractors of Missouri's program to tell the general public of the value of doing work by contract.

Signs Aid Campaign For Contract Work

A sign like that illustrated above will appear on all jobs being constructed by members of the Associated General Contractors of Missouri this season as the first step in a campaign by the association to tell the general public of the value of the contracting industry and of doing construction work by contract.

It is felt that the general public does not know, and should be told, that when public work is done by contract, the contractor does the work for the least possible cost. He has to bid against an unknown number of competitors in order to secure the job and therefore he must offer to do it for the lowest possible price. In spite of the low bid he makes, he pledges his assets to put up a surety bond guaranteeing that he will do that work exactly in conformity with the specifications which are prepared by the engineers. That bond further guarantees that he will do the work for the price which he has bid, and that he will do it in the time specified by the owner in the contract.

These signs, which are 3 x 5 feet on heavy sheet metal with a strong frame on both the front and back, are furnished to members of the A.G.C. of Missouri without any cost to them and will be erected in a spot where they will be seen by the greatest number of people on every job done by members of the association, wherever they may be located.

Rural Road Survey

In the first extensive planning surveys on the improvement of rural roads in relation to the volume of travel and to the location of rural buildings, it has been found that surfaced highways serve 57.2 per cent of all rural dwellings in the United States, according to a report in *Highway Research Abstracts*. Only 22.6 per cent of the rural dwellings are on totally unimproved roads.

Special studies made in ten states indicate further than 65 per cent of all rural dwellings are within a mile of a surfaced road and 77.5 per cent within 2 miles. In a sample of 32 states, there is an average of 2.7 rural dwellings per mile of rural road, while the dwelling intensity along paved roads is 7.1 per mile.

The studies indicate that perhaps 1,800,000 dwellings are on unimproved roads while another 1,500,000 dwellings are possibly on graded and treated but unsurfaced roads, making a total of about 3,300,000 rural dwellings on unsurfaced roads.

Portable Air Compressors

Built in sizes ranging from 20 to 420 cubic feet, Schramm portable compressors are available for any requirements, large or small, on construction jobs. Every type of mounting is offered, including rubber tires with or without spring trailer for high-speed towing, two-wheel trailers, or mounting for any standard make of truck. Combinations are obtainable with power take-off operated by the truck engine, or for gasoline-engine or diesel drive.

A new bulletin on Schramm portable air compressors, illustrating many of these units on the job, has just been issued by Schramm, Inc., West Chester, Pa., which will be glad to send copies on request.

New Catalog on Jacks

Jacks in a wide variety of types and styles to multiply man power and simplify many jobs being done "the hard way" are described and illustrated in the new Junior Catalog 41 just issued by Templeton, Kenly & Co., Chicago, Ill. This line of jacks is designed for lifting, lowering, pushing, pulling and supporting jobs in garages, state and county highway shops, and for many uses on construction jobs.

Copies of this new 60-page catalog, which also includes the recently revised price schedules, may be secured by interested contractors and state and county engineers direct from the manufacturer by mentioning this item.

Converting Light Trucks For Heavy-Duty Service

Chevrolet, Ford and Dodge 1½ to 3-ton trucks may be converted into heavy-duty hauling units up to 13-ton gross weights by means of the Thornton rear-wheel-drive providing four-wheel traction and greater carrying capacity. Twelve wheelbases are available, ranging from 142 to 207 inches for bodies 8 to 20 feet in length. The Thornton design permits proper distribution of the load on the rear axles, with sufficient weight distributed to the steering axle to keep within allowed capacity limits and provide proper traction for steering.

Bulletins describing the Thornton rear-wheel-drive as applied to either Ford, Chevrolet or Dodge trucks may be secured by interested contractors and state and county highway departments direct from the Thornton Tandem Co., 8705-8779 Grinnell Ave., Detroit, Mich.

Want information? Write the Editor.

Gas Tax Receipts Go Up

State taxes were imposed on more than 22,000,000,000 gallons of gasoline in 1940, according to reports of state agencies to the Public Roads Administration, resulting in an increase of 6.2 per cent over 1939. Seven states, New York, California, Pennsylvania, Illinois, Ohio, Texas and Michigan, consumed more than a billion gallons each.

State gas taxes, ranging from 2 to 7 cents, were levied on 1,283,000,000 more gallons than in 1939. These taxes, plus receipts such as license and inspection fees, fines, etc., totaled $870,692,000 for 1940, and $822,013,000 in 1939.

Conger of Truscon Dies

W. N. Conger, who for 24 years was highway reinforcing products salesman for Truscon Steel Co., died last month. Known as "Dad" to many highway contractors and others in the road-building field, Mr. Conger was 85 years old.

Black-Top Surfaces For County Highways

Some of the Problems of Design and Construction Arising in the Quest for Quality and Economy

By H. D. TYSON, Superintendent of Highways, Kankakee County, Illinois

✦ ANY discussion of "black top" must include a thorough understanding of base materials and their action under extreme conditions of moisture and freezing. By a careful study of the actions of various soils, it has become possible to design more carefully the type of drainage and base necessary to a successful black-top surface.

While Kankakee County has neither the personnel nor financial means to become too "soils-engineering minded", the study of soil conditions and reactions to moisture and frost has been the cause of more sensible sound base construction than was the case 10 years ago. We have installed a considerable quantity of tile, perforated pipe and French drains which we formerly omitted as being a source of excessive maintenance cost. After watching thin edges and wet pockets in the base of black-top surfaces "alligator-check" each spring and all too often ravel at a time of year when immediate repair was impossible, we became convinced that fewer miles of bituminous surfacing on adequate well-drained bases mean less money wasted on unnecessarily expensive maintenance. This means, of course, more miles of new construction over a period of years.

Work on Bases

For the past two seasons we have departed to a considerable degree from our former practice of taking a base as we found it and attempting to place upon it a bituminous surface. We now try to have our bases of a uniform thickness and true width, and go to considerable effort to obtain them. Our men dig five or more holes across the road each 100 feet, then we figure the quantity of stone necessary to make a minimum 6-inch thickness 2 feet wider than the proposed surface width and mark that quantity on a stake on the shoulder for use by crews adding the required material.

We find it possible to compact this additional material during one ordinary spring, though in dry seasons it is necessary to apply water and compact by rolling ahead of bituminous surfacing, in order to secure surface consolidation. We consider it more economical to apply the required fines and to wet and roll rather than discard all loose materials ahead of light bituminous surfacing.

Choice of Surfacing

General observation and Kankakee County's experience over 10 years of experimentation has caused us to be partial to two particular types of bituminous surfaces. The one used most in the past few years has been the Sub-Class A-3 surface treatment, a blotter type of surface treatment made up of a prime coat, an application of liquid asphalt SC-3 at the rate of 0.35 gallon per square yard followed by an application of cover-coat aggregate at the rate of 30 pounds per square yard, having a sieve analysis of 100 per cent passing the ¾-inch sieve and retained on a No. 10 sieve. This is followed by a second application of SC-3 asphalt at the rate of 0.3 gallon per square yard, and then by an application of seal-coat aggregate at about 20 pounds per square yard, with a gradation of 100 per cent passing a ⅜-inch sieve and 90 per cent retained on a No. 8 sieve. A third application consists of SC-3 asphalt at the rate of 0.2 gallon per square yard and from 1 to 1¼ pounds per square yard of powdered asphalt as a surface application. The Sub-Class A-3 surface treatment has proved to be waterproof, tough and resilient under all conditions except under spade lug tractors used by farmers.

In this connection I should like to say that I do not believe the design of a road should be changed for a few vehicles of an especially harmful type, but rather that it should be recommended to the General Assembly that the present indefinite law covering the operation of vehicles such as these tractors should be clarified and so rewritten as to provide specific penalties for their use. I also believe that it would be to the greater interest of farm groups and associations to support such a law to the fullest degree, rather than to oppose it as they have done in the past, because the farmers are greater losers than any other group of citizens through damage to secondary roads.

Two other types of surface treatment used in Kankakee County are the Sub-Class B-1 type and Sub-Class C-3. The former is a dense-graded mat of asphalt SC-3 and of a compacted thickness of about 2 to 2½ inches, which we have found to be materially improved by a surface application of 1¼ pounds of powdered asphalt after the mat has been laid according to specifications. The Sub-Class C-3 is a dense-graded aggregate mat similar to B-1 in general gradation and construction, but with powdered asphalt mixed into it at the rate of 20 to 25 per cent by weight of the asphalt SC-3 in the mat. All three pavement types referred to are the standard methods of construction used by the Illinois Division of Highways.

Where there is considerable heavy traffic or narrow steel-tired wagon traffic, we depend quite extensively on a mat of the dense-graded aggregate type, with a wider use of the Sub-Class C-3 than any other kind of mat surfacing. We like the density obtained, with resultant waterproofing from both top and bottom, and the possibility of reworking the surface if it pushes, if pot-

(*Concluded on page 28*)

Soil-Cement Highway Gets Severe Testing

The longest continuous stretch of soil-cement road in this country was constructed last year in Texas, under the supervision of J. W. Puckett, District Engineer for the Texas Highway Department. This 46-mile road is located in Kenedy County, on the Hug-the-Coast Highway.

Though open but a few months, this road has undergone severe tests both by traffic and weather. It has carried an average of 700 vehicles daily, and during the past five months of its use a rainfall of over 25 inches brought the water table up to within 6 inches of the soil cement. A heavy rain in late January left one section of the road under 6 inches of water for more than a month, during which time 2,500 men of the 2nd Division Artillery moved over the road.

In spite of the fact that the road has been saturated for half the time it has been open, District Engineer Puckett reports that surface blemishes and ruptures over quicksand areas will not exceed 500 square yards.

Welded Erection System Described in Manual

A comprehensive manual of recommended engineering practice for the Saxe Welded Erection System as manufactured by J. H. Williams & Co., 400 Vulcan St., Buffalo, N.Y., has recently been compiled by Van Rensselaer P. Saxe, Consulting Engineer of Baltimore, Md. The Saxe erection seat and clip resulted from experiments conducted by Mr. Saxe to find a method of field assembly which would lend itself to less costly shop processes than those used on bolted and riveted work, in an effort to cut down shop and erection costs as applied to welded work. According to the manufacturer, this erection seat and clip has been improved through experience obtained in actual practice and will today produce an easily fabricated and erected job for assembly of steel frames at very low cost.

This manual contains line drawings of the Saxe seat and clip, instructions for its use, tables giving standard direct web welded connections and standard welded web angle beam connections, detail drawings of welded connections assembled with this seat and clip, and welded steel specifications. Also, as a guide to actual conditions which will be encountered during welding operations, there is included data taken from "The Welder's Trouble Shooter" published by the Westinghouse Elec. & Mfg. Co. Copies of the manual may be obtained from J. H. Williams & Co.

New Representative For Morris in Detroit

Morris Machine Works, Baldwinsville, N. Y., manufacturer of centrifugal pumps, hydraulic dredges and steam engines, has announced the appointment of L. J. Lynch as its new representative in the Detroit District, with offices at 403 Kales Building, Detroit, Mich.

Oil-Mix Surfacing For Okla. Air Field

New Mixing Equipment Permitted a Change in Specifications: Top 2 Inches of Entire Field Stabilized

✦ THE Oklahoma Air College, located near Yukon, Oklahoma, and about 10 miles west of Oklahoma City, was faced with the problem of hard surfacing about 180,000 square yards of its field in order to provide a suitable training area for its students, who graduate to enter Randolph Field at San Antonio, Texas. The work was considered a temporary project for the emergency, and therefore the surfacing had to be figured as a minimum-expense proposition.

There are no runways at this field and the hard surfacing covers all of the field, except the west portion which is sodded. The original plans called for sheepsfoot tamping of the entire area, followed by pneumatic rolling and sealing with a heavy road oil to which was to be applied 20 pounds of sand per square yard as a blotter.

The Town-Sco Equipment Co. of Oklahoma City discussed the work with Clarence Page, Vice President of the Oklahoma Air College, with the result that the specifications were changed to provide for 2 inches of mixed material at the top, stabilized with SC2 road oil, rather than merely a surface treatment.

The work proceeded by sheepsfoot tamping of the base soil to within 2 inches of the surface, and then heated SC2 road oil was applied at the rate of ½ gallon per square yard by a pressure distributor. Then it was thoroughly mixed with the top 2 inches by a Seaman 5-foot heavy-duty Pulvi-Mixer pulled and driven by a pneumatic-tired industrial tractor. Following this, another half-gallon of the SC2 road oil was applied and again mixed with the top 2 inches by the Seaman Pulvi-Mixer. This left the field smooth for pneumatic rolling and resulted in a shallow layer, 2 inches deep, of stabilized material instead of the contemplated surface seal.

The handling of this work by blading would have been impracticable because the field was not level, the amount of material to be handled was small, and the estimated cost would have been about four times as much.

Mixing 2 inches of topsoil and SC2 road oil with a 5-foot Pulvi-Mixer at Oklahoma Air College.

New Scraper Model Has Double Bucket

The new Model FU Carryall cable-controlled scraper, recently announced by R. G. LeTourneau, Inc., Peoria, Ill., and Stockton, Calif., is equipped with the patented double bucket and has a struck capacity of 17.7 and a heaped capacity of 23 cubic yards. The Model FU is designed for use with a D8 tractor and can be loaded with or without a pusher.

The double-bucket feature incorporated in this model gives the effect of loading two small Carryalls one after the other. The rear bucket telescopes forward and is loaded separately. After the first bucket is loaded to capacity, it travels back on rollers and roller bearings, instead of being forced back, and the second or front section of the bowl is then loaded. High sides prevent the material boiling over and a new apron design is said to increase capacity, reduce overflow, and facilitate loading by reducing entrance friction. To keep the sheaves free from dirt, the cable is dead-ended on the apron and a sliding block sheave assembly mounted upon the spring pipe.

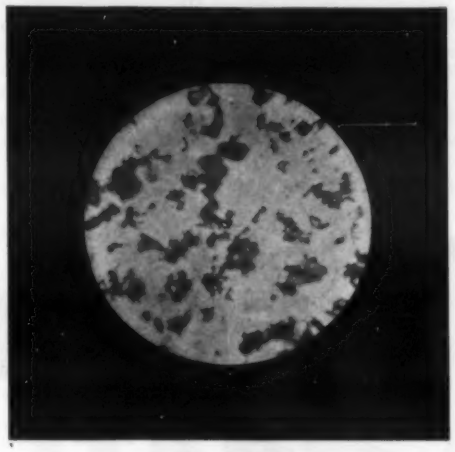
In order to make the Model FU adaptable for all types of job conditions, it may be equipped with a large variety of tire sizes. The front may have two 24 x 32's or two or four 18.00 x 24's, while the rear may have two 24 x 32's or four 18.00 x 24's.

Material-Handling Buckets

The latest catalog issued by the Wellman Engineering Co., 7012 Central Ave., Cleveland, Ohio, is a loose-leaf binder containing bulletins on the complete line of Williams clamshell and dragline buckets for all types of material-handling and digging jobs. The models include the Williams clean-up rehandler of welded rolled steel construction, the Favorite general-purpose bucket in ⅜ to 3-yard capacities, the Hercules heavy-duty bucket for hard digging, the extra-heavy-duty model for under-water dredging or very hard dry excavating, the multiple-rope double-hinge bucket for excavating or material handling, as well as Williams dragline buckets.

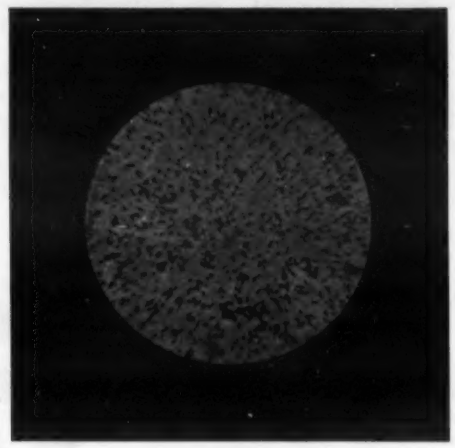
Copies of this catalog, which describes and illustrates the features of Williams buckets, may be secured by those interested direct from the manufacturer or from this magazine.

CEMENT DISPERSION *with* POZZOLITH *gives* *Portland Cement* MAXIMUM EFFICIENCY



UNDISPERSED
Cement in water in its normal flocculated condition.

Photomicrographs — Magnification 300



DISPERSED
Cement in the dispersed condition produced by adding a dispersing agent.

Portland cement is one of the valued inventions of mankind. The vast acreage of concrete is ample testimony to its widespread utility. But due to flocculation, it does not realize, unaided, its full possibilities.

Authorities have long known that dispersion of cement particles would greatly increase the efficiency of the cement, and augment its durability.

The discovery by the Master Builders Research Laboratories in 1930 of a practicable cement dispersing agent and its incorporation in Pozzolith made possible for the first time the application of dispersion to all types of hydraulic cement.

The past decade, devoted to introducing Pozzolith and proving its value in actual construction to engineers, contractors and owners, has firmly established its validity. The wide use of Pozzolith today, in hundreds of small private projects as well as giant defense works, is the natural consequence of this ten year record of successful performance. Contractors and builders in every field are now using Pozzolith because they know it assures them these 5 great advantages —

1. Durability increased 50% or more.
2. High early strength — 20% or more increase in compressive strength at all ages.
3. Water reduction — up to 20% — slump increased 150% or more for given water ratio.
4. Increased water-tightness — 20% or more reduction in absorption and permeability.
5. Reduced bleeding and segregation.

SPEED AND ECONOMY—

Important to all contractors and builders is the fact that in addition to the above advantages Pozzolith speeds up the job but adds no increased over-all cost and in many cases substantial savings are made.

Send for the complete story of Cement Dispersion (Research Paper No. 35), the facts about Pozzolith, and details on how to speed-up and save.

THE MASTER BUILDERS COMPANY
CLEVELAND, OHIO TORONTO, CANADA

AS TO ITS PERFORMANCE IN THE FIELD

We Refer to these Representative USERS

1. Black & Veatch Engineering Co., Kansas City, Missouri, 7 projects since 1930.
2. Consoer, Townsend & Quinlan, Chicago, Illinois, 4 projects since 1930.
3. J. E. Sirrine & Co., Greenville, South Carolina, 8 projects since 1930.
4. The Erie Railroad, 9 projects since 1930.
5. The Union Pacific Railroad, 8 projects since 1930.
6. The Santa Fe Railroad, 4 projects since 1930.
7. Morris Knowles, Inc., Pittsburgh, Pennsylvania, 7 projects since 1930.
8. Burgess & Niple, Columbus, Ohio, 9 projects since 1930.
9. Robert & Co., Atlanta, Georgia, 15 projects since 1930.
10. Marsh, Smith & Powell, Los Angeles, California, 12 projects since 1930.

LARGE DEFENSE WORKS

11. Ravenna Ordnance Depot, Ravenna, Ohio, over 740,000 pounds used in exposed concrete.
12. Iowa Ordnance Depot, Burlington, Iowa, over 200,000 pounds to date in igloos and other work.
13. Douglas Aircraft Co., Inc., Long Beach, California, over 220,000 pounds in structural concrete.
14. The Aluminum Corporation, over 1,000,000 pounds used in several projects in Canada and U. S. A.

Numerous references from all districts sent on request.

MASTER BUILDERS

Concreting Flood Wall At Kittanning, Penna.

(*Continued from page 1*)

stone revetment protects the river bank from destructive scour immediately above the abutment of the dam on the Kittanning side.

New Concrete Flood Wall

The flood wall is of the cantilever type with a maximum height of 10 feet, but the methods of construction and the form work constitute items of distinct interest. The footing is 8 feet wide, 15 inches high on the outside, sloping 1 to 8 on the river side of the wall, and 1 to 4 on the land side, making the footing 2 feet 4 inches thick in the center. The footing was poured first with dowels and a 4 x 6-inch keyway in the center. The wall, which extends above it, was poured separately and has a coping on the river side 5 inches thick, sloping on a 26½-degree angle to the wall, and 21 inches thick at the top. The wall is battered 1 to 24 inches on both sides with a 45-degree haunch at the bottom to take care of the shear. The footing and wall were poured in 30-foot sections with a 16-inch copper water stop and a ⅜-inch cork expansion joint reaching from the water stop to the faces of the wall.

The excavation consisted of an old dirt dike which was pushed over the bank by a Caterpillar diesel tractor and a bulldozer to make the proper slope of the river bank. The footing excavation was done by a ¾-yard Bucyrus-Erie gas shovel and the material used to form a roadway, elevated sufficiently and wide enough for a 27-E Koehring paver which mixed all the pre-batched aggregate and cement for the concrete footing and wall. The footing excavation for 2,500 feet consisted of gravel and sand, and the balance was in an old slag dump, with the exception of about 400 feet in an old refuse heap where it was necessary to excavate 15 to 16 feet deep. The broken pottery that was encountered was removed and the section backfilled with impervious material hauled about a mile from a mine and rolled to form a firm foundation for the footing. At another point a considerable amount of loose gravel

Hand placing of riprap on the Kittanning flood wall.

with large stones was encountered. This was excavated and replaced with impervious material. All of this footing excavation cast on to the land side of the wall was used to form a berm upon the completion of the wall and brought up to within 4 feet of the top of the wall. The Koehring dragline was used to pull a 36-pound I-beam, totaling 2 tons in weight, to grade the bank.

Concreting for Flood Wall

The wall forms were built up of ¾-inch plywood for the top 4 feet and then 1 x 12-inch boards, dressed both sides, at the bottom to make up the variable height of the wall which sloped from Elev. 805 at the upper end to 804 at the lower end of the wall. The studs were 2 x 4's on 12-inch centers with the first wale 12 inches from the bottom. The spacing was varied slightly with the height of the wall, but three sets were used throughout. The forms were tied together with Universal Spi-Ro-Loc ties, using ½-inch rods on 4-foot centers and braced with five 4 x 4's on both sides of each 30-foot section during pouring.

The mixed concrete for the wall was delivered by the 27-E paver to a bucket especially designed by the Superintendent, Joseph Weinstock, for this class of work and made by Cullen & Friedsted of Chicago. The guillotine gate in the bottom is sufficiently heavy to close automatically when the handle is released. The bucket is mounted on the same carriage as the paver bucket and is swiveled on a 2-inch bolt so that no matter what may be the position of the paver and boom, the bucket can be swung straight along the form as it opens up 8 inches wide and 30 inches long to deliver the concrete into the narrow top of the form. A Chicago

(*Concluded on next page*)

Riprap Will Protect River Bank Above Dam

(*Continued from preceding page*)

Pneumatic compressor was carried on a platform mounted on the paver to operate two C-P air vibrators for consolidating the concrete in the forms. When the forms were stripped from the concrete the wall was immediately painted with Aquastatic, a colorless curing compound, which seals in the water, permitting its full use in hydrating the cement.

For clean-up along the wall a Bucyrus-Erie 10-B was used effectively. For a short section, where the concrete wall was not needed and an earth slope would have been too flat, concrete cribbing, furnished by the Concrete Products Co., Neville Island, Pa., was used, backfilled with earth.

Stone Revetment

The 541 feet of stone revetment consisted of a toe of ¼ to 2-ton derrick stone cut from large sandstone boulders and a 50-foot blanket of 18-inch rock also hand cut from boulders. These were all prepared by common labor using wedges and malls. The specifications required that the rock be laid one stone or 18 inches thick and that the stone be not less than 1/3 the depth in any other dimension. The stone as cut weighed from 125 to 150 pounds each.

The slope was dressed by a Koehring dragline with a 1¼-yard Page bucket, after the dragline had built a road along the toe and dug the trench, placing the excess material on the bank for grading. The dragline then set the toe stones with chains. Grade boards consisting of 2 x 4's on stakes were set 25 to 30 feet apart on the slopes, as shown in one of the illustrations. The riprap stone was dumped from the top and then handled by men who fitted the stones together, using the knocked-off pieces for chinking in the space between the rocks at the top.

Personnel

The contract for the construction of the flood wall and placing of the stone revetment on the left bank of the Allegheny River, immediately above the Allegheny River Dam No. 7, was awarded to Stewart O. Strandberg of Chicago, Ill., on a bid of $73,825.50. Joseph Weinstock was Superintendent for the contractor. The work was done under the direction of the Pittsburgh Office, U. S. Engineer Department, Lt. Col. L. D. Worsham, District Engineer, with H. P. McKowan as Resident Engineer.

Hoisting Engines

Gasoline and electric hoisting engines, made by Orr & Sembower, Inc., Reading, Penna., are described and illustrated in Bulletin D issued by this company. The manufacturer states that friction drums are cast in one piece, perfectly round, balanced and smooth, eliminating excessive strain and wear on the shaft bearings and on the drum cable. They have extra-long bronze-bushed bearings which are easily oiled from the outside. A steel washer is inserted between the drum and the drum spring, thus protecting the hub of the drum. The frictions on the 5 and 10-hp hoists are the standard single-cone type, made of wood, while all frictions on units above 10 hp are of the V type composed of Asbesgraphite patented moulded friction blocks securely bolted to the gear wheels.

Complete specifications are given for all models in this bulletin, copies of which may be obtained by writing direct to the manufacturer and mentioning this item.

Trailer Distributor For Road Maintenance

The Model SJ maintenance distributor made by Standard Steel Works, North Kansas City, Mo., is designed for use by state, county and town highway departments for all types of bituminous patching, repair work and small resurfacing jobs. This model, which is mounted on its own trailer, is equipped with both a hand spray for patching jobs and a spray bar for resurfacing work.

The pumping arrangement permits loading the unit from either storage facilities or tank car, eliminating the necessity of auxiliary loading equipment, and also permits the transfer of material from tank car to storage. Pump sizes vary from 35 to 100 gpm. The ability to circulate and bypass material back into the tank facilitates heating, and an adjustable bypass gives the operator control of pressure from zero to 35 pounds, permitting crack filling by means of the hand spray without spattering the pavement. The unit is furnished with two return bend fire tubes for instant heating.

The tank on the Model SJ has a capacity of 500 gallons, the chassis is rugged, fitted with long heavy-duty springs, bronze-bushed shackle bolts, and Alemite fittings at all grease points. Twenty-inch dual wheels, pneumatic tires and Timken roller bearings are standard equipment. The towing eye is adjustable to varying truck heights.

A Standard Model SJ maintenance distributor and hand spray in use on highway patching.

Further information on the Model SJ maintenance distributor, as well as on other distributor models made by this company, is contained in Catalog No. 600, copies of which may be secured direct from the manufacturer by mentioning this magazine.

The Inter-American Highway

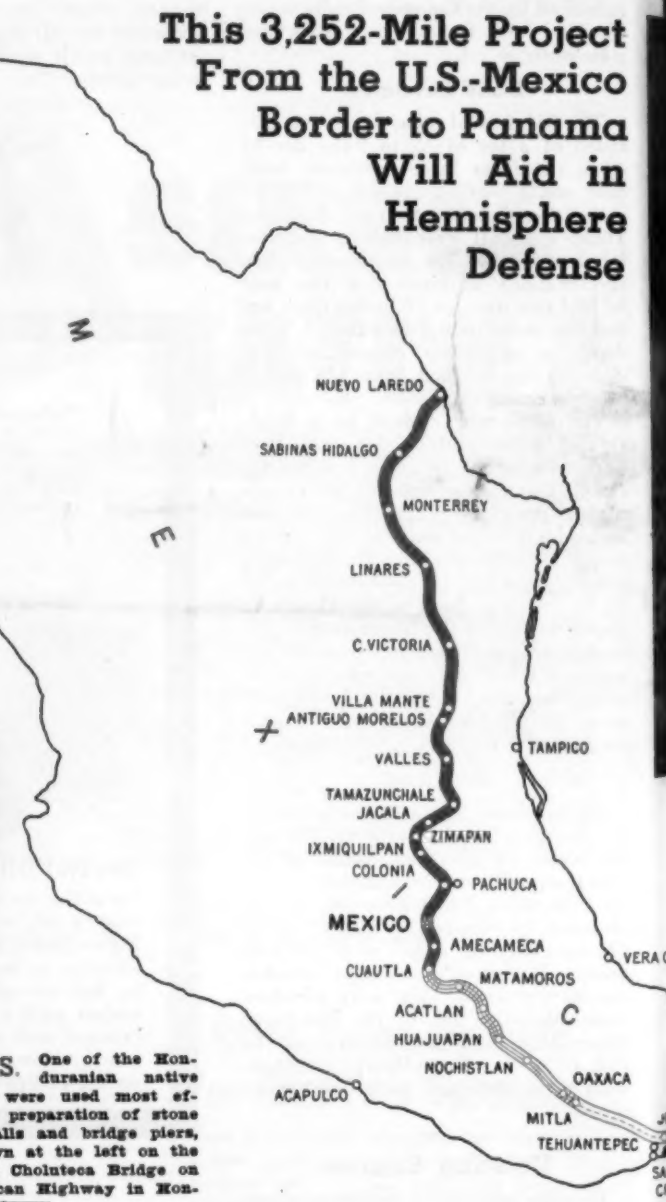
GUATEMALA. Reproductions of Mayan art decorate the posts of the approach rails (at left) on the Tamazulapa Bridge on the Inter-American Highway in Guatemala. This is one of the fifteen bridges built with United States cooperation.

This 3,252-Mile Project From the U.S.-Mexico Border to Panama Will Aid in Hemisphere Defense

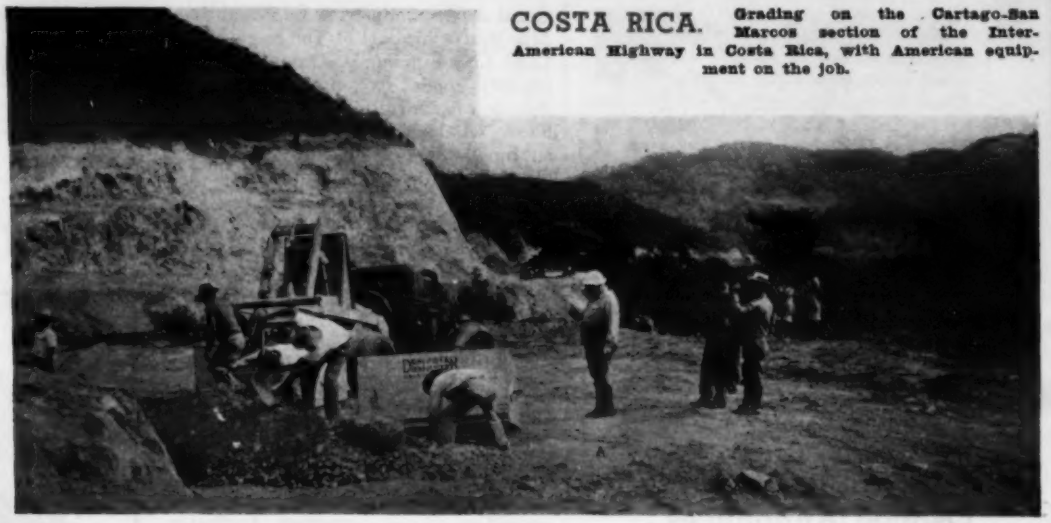
HONDURAS. One of the Honduranian native craftsmen who were used most effectively in the preparation of stone for masonry walls and bridge piers, such as is shown at the left on the approach to the Choluteca Bridge on the Inter-American Highway in Honduras.

NICARAGUA. The Maderas River Bridge in Nicaragua, another of the bridges in the construction of which the United States cooperated. At the far end, grading for the approach to the bridge is under way.

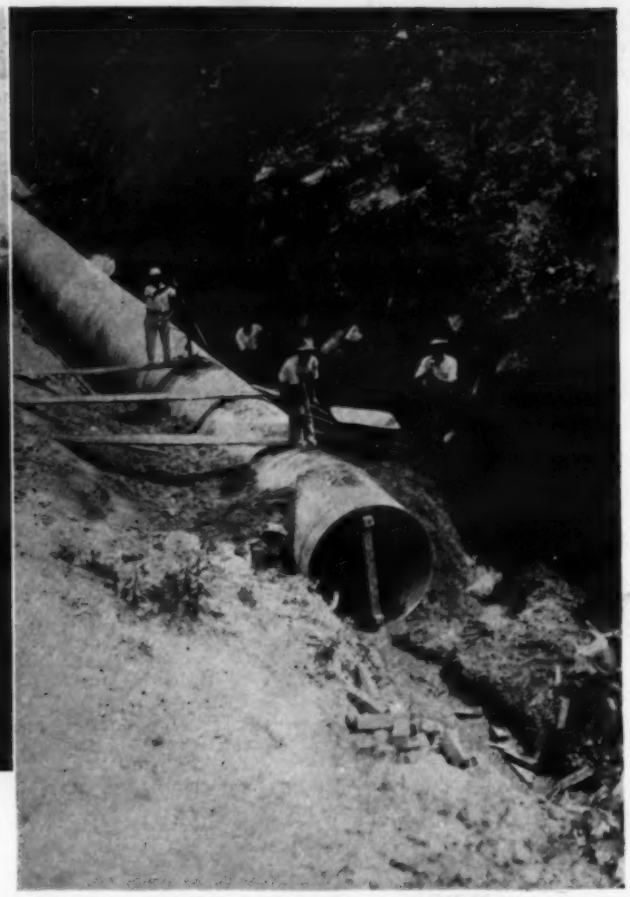
EL SALVADOR. Salvador with American-made road-building equipment.



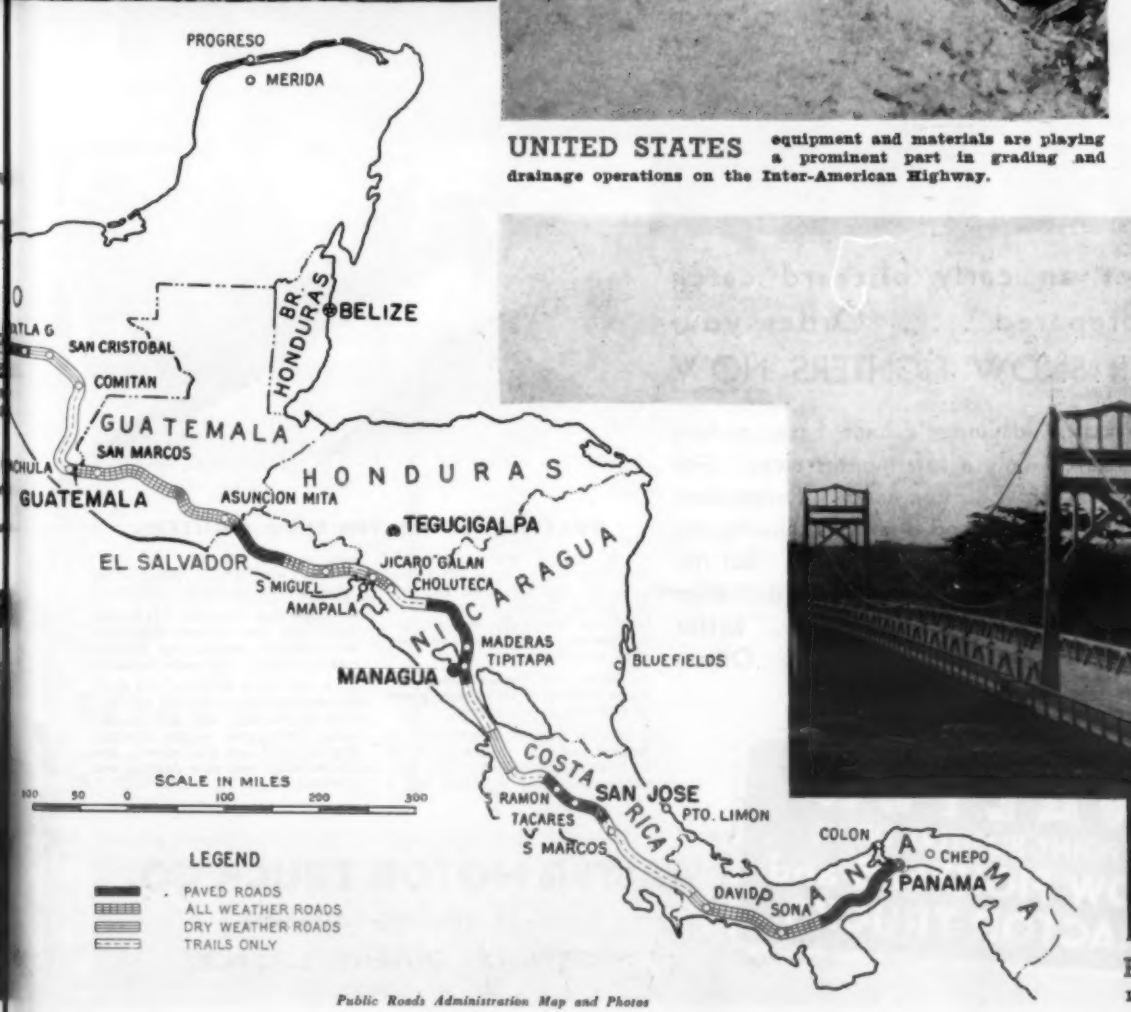
MEXICO. Typical alignment, center-line marking and guard-rail installation on the Laredo, Texas-Mexico City section of the Inter-American Highway. This section was opened to traffic in July, 1936.



COSTA RICA. Grading on the Cartago-San Marcos section of the Inter-American Highway in Costa Rica, with American equipment on the job.



UNITED STATES equipment and materials are playing a prominent part in grading and drainage operations on the Inter-American Highway.



Public Roads Administration Map and Photos

PANAMA. The Chiriqui 787-foot suspension bridge over the Chiriqui River in the Republic of Panama and, top photo, a view of the construction of this structure.

The new Osgood Mobilcrane mounted on pneumatic tires.

Osgood Announces New Mobile Crane

Among the features of the new Model 705 WM Mobilcrane, recently announced by the Osgood Co., Marion, Ohio, are air control of all movements, independent boom hoist, independent travel and swing motions, and hook rollers.

The Mobilcrane is not a truck crane; it is mounted on pneumatic-tired wheels but is operated by one motor and one man, and has been on the market for over a year. The new model is a sturdy strong machine, designed to travel over rough ground and work under severe conditions. A feature of the extra-strong truck frame is its three-point suspension to eliminate twist and strain when traveling over rough surfaces. All six pairs of wheels on the Model 705 WM are equipped with air brakes which can be applied instantly so that the operator can hold the machine on any grade it is capable of traveling.

Air control of all motions, except the hoisting brake, is through the use of Twin Disc clutches on the swing, travel and hoisting mechanisms. The independent boom hoist, operated by two Twin Disc clutches, provides power up and down. Independent travel is provided by a Twin Disc clutch, with change of direction being made through bevel gears.

Further information on the Model 705 WM Mobilcrane may be secured direct from the manufacturer by mentioning this magazine.

Sublimed Blue Lead For Bridge Painting

A product which has had 30 years' background of service as a rust inhibitor in the structural steel field is now taking on increasing importance with the absorption of other paint products by national defense industries. Eagle sublimed blue lead, a product of The Eagle-Picher Lead Co., Cincinnati, Ohio, is a fume product made by subliming selected galena ore, lead sulphide, in special furnaces. As used for bridge painting, the sublimed blue lead fine pigment is ground in linseed oil and thinned to paint consistency.

Many large structural steel fabricators use this material as a shop coat instead of the traditional red lead, which also is made by Eagle-Picher. Many engineers are already recommending the use of Eagle sublimed blue lead for painting steel bridges, according to the manufacturer, with full assurance that they are not recommending a substitute product for other recognized metallic paints, since this product has many outstanding advantages in retarding the rusting of steel through the exclusion and chemical prevention of rust formation. Exclusion is accomplished by the dense homogeneous film of the lead, through which moisture, corrosive vapors, and the oxygen of the air cannot penetrate. This property is increased by the proper relation between the pigment and oil volumes, the chemical bond between the oil and the pigment, the uniformly fine pigment particles, and the pigment remaining unchanged when in contact with the atmosphere. The surface of the steel is therefore protected from carbon dioxide, sulphur dioxide, sulphurous acid, carbon monoxide, soot, etc., all of which are agents of deterioration. This paint expands and contracts with the steel, as changes in temperature occur, and does not sag when applied to perpendicular surfaces in recommended formulation.

Full details of this product will be found in a helpful booklet "How to Use Eagle Sublimed Blue Lead," which will be sent to readers of CONTRACTORS AND ENGINEERS MONTHLY free on request addressed to the manufacturer and mentioning this item.

Louisiana Bridges Built on Dry Land

(*Continued from page 2*)

dredged on either side of the falsework. The outriggers were necessary so that the barges could remain outside the area of the falsework. When the barges' buoyancy was increased by pumping out some of the water, they lifted the span clear and then were towed across the line of the structure with the span straddling each of the piers it passed over. This method was used for both the easterly span and the longer center span, while the westerly span was assembled in place on the falsework.

Railroad Bridge Construction

The railroad bridge for the single-track line of the Southern Pacific Railroad is designed for an E60 loading and has three uniform 400-foot spans. There are also approach girders 70 feet long at each end of the main bridge. The two center piers for this structure were carried to Elev. —150 feet mean Gulf level from a ground level of Elev.+10 feet. They were put down by the open-caisson method with three dredge wells in each pier. The end piers were carried down to Elev. —90 feet mean Gulf level. All of the concrete for the railroad piers was placed by the Pumpcrete method.

Erection of the steel for the railroad bridge was an erection man's dream, as from end to end the structure was built over dry land with ground level only some 5 feet below low steel. The bottom chord of the structure was carried on falsework consisting of mud sills carrying large steel wedge jacks with ratchet-operated screws for pulling them together to raise the structure and maintain the proper camber.

The railroad bridge was completed ahead of the highway bridge, but because of the tangle of old highway location and new railroad location which created the two grade crossings, the railroad bridge could not be put into service until the highway bridge was completed and traffic removed from the old location of U.S. 90.

Personnel

The highway bridge was designed under the direction of N. E. Lant, Bridge Engineer of the Louisiana Department of Highways, and the contract for its construction was awarded to the Missouri Valley Bridge & Iron Co. of Leavenworth, Kansas, with the Mount Vernon Bridge Co. of Mount Vernon, Ohio, as the subcontractor on steel erection. The highway bridge was started January 12, 1940, and was completed last month. Philip Angier was Resident Engineer for the Louisiana Department of Highways on this project and Paul Galbraith was Superintendent of construction for the contractor.

The railroad bridge was designed for the Southern Pacific Railroad by Modjeski & Masters, and J. F. Coleman Engineering Co., of Harrisburg, Penna., and New Orleans, La., respectively. The contract for construction was awarded to the McWilliams Dredging Co. of New Orleans, La., with the Bethlehem Steel Co. as subcontractor for steel erection. N. K. Helmers was associated with the general contractor on this work. The railroad bridge was started on May 1, 1940 and completed by May 15, 1941. Theodore Torgerson was Superintendent for McWilliams Dredging Co., and O. F. Sorgenfrei was Resident Engineer for Modjeski & Masters and J. F. Coleman Engineering Co.

The highway bridge was built for $597,373.00 and the railroad bridge for $837,995.00. M. D. Hogan was the representative of the U. S. Engineer Department, New Orleans District.

Vibration Paving Of Concrete Highways

The highlight of a new bulletin issued by the Blaw-Knox Co., Pittsburgh, Penna., on vibration paving of concrete highways is a comparative description of core tests taken from vibrated and non-vibrated sections of a recently paved Indiana state highway project. According to this bulletin, the core tests show that it is possible to improve uniformity and compressive strength through the use of the new Blaw-Knox spreader vibrator. Compressive strength tests reveal that the vibrated pavement had an average strength of 6,860 pounds per square inch while the non-vibrated pavement had an average strength of 5,403 pounds per square inch. Further, the variation in the vibrated slab was only 1,760 pounds, whereas the non-vibrated pavement has a variation of 3,300 lbs. from strongest to weakest sections.

Copies of this bulletin may be obtained direct from the manufacturer.

Black-Top Experiments In Kankakee County

(*Continued from page* 18)

holes occur or it distintegrates to an extent requiring more than ordinary maintenance.

We are not yet sure whether mixing powdered asphalt into the entire mat is desirable. It would seem possible that more advantageous pliability is retained either by using the powdered asphalt as a surface application or mixing it into the top third of the mat.

Where light traffic demands a dust-proof surface and where many miles of roads and limited finances present a difficult problem, a well-constructed adequately drained base with a bituminous surface treatment, constructed with slow-curing asphalt and powdered asphalt, medium-curing asphalt or tar, or asphalt or tar cement will provide an adequate dust-proof surface for a considerable number of years at a cost of one-third to one-half less than the cost of the various mats. Just as a good roof is a poor investment on a poor house, so is a good surface treatment a poor investment on an inferior base.

Kankakee County's Experiments

We have experimented during the past 2 years with the application of 8 to 10 pounds of limestone fines or torpedo sand after the application of powdered asphalt on the Sub-Class A-3 surface treatment, and have found it very satisfactory and worthwhile as a means of filling the surface voids and giving immediate surface density. We have also applied a similar quantity of sand on the fog coat in the dense-graded aggregate mat with very beneficial results, as far as general appearance is concerned. This sand, when lightly broom-dragged, fills all surface voids and places which have been somewhat torn in the final planing operation. This practice is especially helpful during late-season work, or in city and village work where the immediate surface appearance means much to the adjacent-property owners who may be paying part of the direct cost.

It is possible that, in our zeal for a dense top, we have overstressed fineness of aggregate and eliminated, to a certain degree, stability of mix. I believe that our specifications for dense-graded aggregate types could be improved by including a somewhat greater percentage of the larger-sized aggregate without sacrificing any density, which is not obtained by fineness of aggregate alone. If we are able to increase stability by the inclusion of more top-sized aggregate, we can decrease the apparent tendency, under certain conditions, of a dense-graded aggregate mat to become unstable and subject to shoving where heavy traffic applies brakes at stop signs. The only section of road which we have built which has shown any tendency to shove was one job where we apparently made too heavy a final application of bituminous material. This was later rectified by scarifying, reblading, and adding a small quantity of aggregate.

It may also be that we are attempting too zealously to approach a sheet asphalt surface on our seal coats of bituminous surfaces of any type. Observation of work in various other states indicates a general tendency to seal with a large-sized aggregate, disregarding the fact that it is not so quiet under traffic, although always skid-proof. While I personally prefer the smooth quiet-riding surface and believe the aggregate used in some states may be larger than necessary, I think we might well engineer some safety into our black tops even at the expense of traffic noise.

Finally there is the question of the advisability of insisting upon the addition of rather minor quantities of sand to aggregate for dense-graded bituminous surfacing. Having used some material from the same source without sand, with the same apparent result, we believe that we may be unduly increasing the cost without any direct benefits. It is better to change the design to fit the limits of local materials than to make materials fit exact proportions in any pavement so inexactly designed as bituminous surfacing. If local materials can not fit an exact design, let us keep prices within reasonable limits by changing the design to fit available materials, as long as no apparent change in quality results.

From a round table discussion at the Illinois Highway Conference, March, 1941.

Hose of All Types For Construction Jobs

The complete line of Goodall rubber hose to meet all kinds of hose requirements on construction jobs is described and illustrated in a 68-page catalog No. 207, copies of which may be secured by interested contractors and state and county highway departments direct from the Goodall Rubber Co., Inc., 2 So. 36th St., Philadelphia, Penna.

In addition to various types of water, steam and air hose, the Goodall line includes concrete placing and grouting hose, hose for use with Gunite machines and Pumpcrete units, cement hose, suction, and hydraulic hose. This company also makes a complete line of conveyor belting, belts for mucking machines and elevating graders, transmission belting, as well as an assortment of gaskets, hose couplings and similar hose accessories.

Time Studies Made On Nev. Grading Job

(*Continued from page 2*)

One tractor and scraper made the round trip in an average of 19 minutes, as follows:

Loading time	3.5	minutes
Traveling time (from load to dump)	6	minutes
Spreading time	3	minutes
Return trip from dump to pit	6	minutes
Idle, waiting for pusher	0.5	minutes
Total time	19	minutes

A Pioneer No. 48V duplex portable crushing plant powered by a Caterpillar 180-hp diesel engine was set up to furnish the gravel aggregate for the plant-mix asphaltic surface.

Personnel

The contract for this 17-mile reconstruction project on U. S. 40 in Nevada was awarded to Fredericksen & Westbrook of Sacramento, Calif., for whom Paul J. Moore was Superintendent. For the Nevada Department of Highways, Julian A. Glock was Resident Engineer.

Clamshell Buckets

The Hayward Class K-6 digging type clamshell bucket is designed for use in all kinds of excavating and is built of high-grade materials throughout. The upper center is a compact electric steel casting combining in one piece all the structural details of the head of the bucket. A separate two-way four-roller closing line guide is secured to this upper center. The lower center is also an electric steel casting, simple in design and sufficiently heavy to act as a counterweight for rapidly opening the bucket. It is prepared to take the main hinge pins and is formed to provide a heavy support for the closing sheave frames. Alemite lubrication is used, with separate greaseways to each bearing.

An illustrated bulletin, No. 680, describes the Class K-6 bucket in detail. Copies may be obtained direct from The Hayward Co., 32-36 Dey St., New York City, by mentioning this item.

New Ransome Dealer

Announcement has been received from the Ransome Concrete Machinery Co., Dunellen, N.J., of the appointment of the Northwestern Road Supply Co., Lincoln Bldg., Watertown, So. Dak., and The State Tractor & Equipment Co., 815 E. Jefferson St., Phoenix, Ariz., as distributors of the complete line of Ransome concrete equipment in their respective territories.

W. McK. White Jr. Joins Father in White Mfg. Co.

W. McKean White, Jr., has been elected Vice President of the White Mfg. Co., Elkhart, Ind. Mr. White was graduated from Purdue University as a Mechanical Engineer and will be Engineering Assistant to his father, W. McK. White, President of the White Mfg. Co. This firm manufactures portable asphalt plants, asphalt and tar kettles, concrete vibrators, front-end loaders for industrial tractors, and aggregate driers.

Reconnaissance Work On Highway to Panama

(*Continued from page 9*)

cooperation.

In June, 1930, three American engineers and an economist familiar with commercial and industrial conditions in Central America proceeded to Panama where a small field office was opened. Reconnaissance was started at the south end and generally carried northward. Only a single reconnaissance party was used, as this was more economical and served to familiarize the same group with the entire route.

It was found that reconnaissance could not be made continuously in one direction owing to topographic conditions and difficulties of transportation; consequently definite control points were established from which surveys could be made northward or southward under the most favorable conditions possible.

In each country local engineers were designated to cooperate with the American engineers, and at the frontiers representatives of the adjacent countries were brought together and an agreement reached for a common meeting point.

The field work was completed late in 1932, the survey having included approximately 1,600 miles of selected line and many hundred miles of rejected line. The general methods followed were a combination of aerial and ground work involving first the exploration and fixing of control points which guided the fliers of France Field, Canal Zone, in taking aerial photographs of the areas covering the line. Every advantage was taken of open intersections of rivers and easily identified geographical formations, small towns, or other distinguishable features which could be used by the fliers, and artificial control points were marked only where natural features were not available. These consisted of large white symbols staked out in cheesecloth on the ground or in the tree tops.

Photography was usually done at a fixed altitude sufficiently high to clear the terrain, which resulted in photographs of varying scales as the land rose and fell. The photographic mosaics when completed were then adjusted for scale by the use of cadastral measurements between known points on the

Public Roads Administration Photo

The Tamazulapa River Bridge on the Inter-American Highway in Guatemala.

mosaics, and the entire line as finally selected was plotted to uniform scale by making the necessary adjustments. Elevations were taken generally by aneroid, and checked wherever possible with previously known elevations incident to earlier explorations or railroad locations which were encountered in practically every country.

The reconnaissance report was completed late in 1933, submitted to Congress, and published as Senate Document No. 224, 73rd Congress, 2nd Session.

Changes in Route

Since the original reconnaissance surveys were completed, there have been three definite changes made for local reasons, but otherwise the line has in general been approved by each of the countries through which it passes. Beginning at the north end, a substantial change in the route was made by Mexico, largely because of the difficulty of finding a good location south to Oaxaca and the barrenness of the intervening territory. The new location, on the Pacific watershed instead of in the interior valley, is undoubtedly an improvement over the original route, both economically and structurally. The territory through which the road will pass is more densely populated, the use of Cuautla as a control point creates an additional circular tourist route based on Mexico City, and the climate and tourist attractions along the western line are better throughout. Further, the railroad to Oaxaca is not so closely paralleled and has a chance to continue serving its separate territory.

Both of the other major changes from the original reconnaissance were made because Costa Rica and Nicaragua had national railroads on good locations and the respective governments did not wish to create a competing line of communication.

Each of the countries has by some action definitely accepted the general route

(*Continued on next page*)

Inter-American Route Result of Joint Effort

(*Continued from preceding page*)

as now projected. Cooperative construction of controlling bridges, local road-building programs, plans and financing of specified sections of highway to be built presently have served to limit future changes from the generally accepted line. The actual common points on the frontiers are located except on the north and south boundaries of Nicaragua.

Result of Cooperative Effort

Soon after the submission of the reconnaissance report, Congress appropropriated $1,000,000 to assist the other governments in constructing immediately necessary desirable features of the highway on terms of cooperation satisfactory to the President of the United States. Under this appropriation, which was used largely for the purchase of American equipment, materials and supplies, nine bridges were built by contract and six by force account. Five other bridges were surveyed and designed in three countries requesting assistance. Four other bridges were investigated and the local engineers were advised and assisted in planning structures. Four road surveys were made, totalling approximately 125 miles. Four additional reconnaissance lines were run to determine alternates to the original proposals as requested by the governments. These were all internal changes and did not affect common points at the frontiers. The total of such additional reconnaissance lines was approximately 160 miles. Three sections of highway were put under construction in Guatemala, Nicaragua and Costa Rica, totalling about 55 miles. Standard bridge plans for twelve different spans were prepared for general use.

The terms of cooperation were adjusted in each case, according to a common formula satisfactory to the President, by which American equipment, materials and supplies would be furnished to each of the cooperating countries on projects jointly selected for construction. The United States also furnished the engineering advice and inspection; the other countries furnished all common and skilled local labor, all local materials, and considerable local transportation. The use of nationally owned facilities, such as wharves, lighters, railroads, telegraph and posts, was furnished in most cases free of charge. All imports for the conduct of the work were entered duty free.

In order to avoid fiscal and other complications that might arise, the cooperative construction was planned on the basis of items of work, the local governments performing certain items of work and paying all the bills and the United States performing certain other items and paying the respective charges. In this way no transfers of funds between the cooperating parties were ever made, nor were questions raised by either side regarding the validity of expenditures by the other.

Among the bridges constructed were three suspension bridges: one over the Chiriqui River in Panama, 787 feet in length overall; one over the Choluteca River in Honduras, 1,088 feet out-to-out of anchorages; and the third, 486 feet in length, over the Tamazulapa River in Guatemala. Most of the smaller spans were from 96 to 120 feet in length.

In the course of the construction period, it became necessary to make additional small appropriations to put into effect other legislation which provided for engineering advice and assistance to the Latin American republics, and to furnish desirable inspection and field engineering on the construction carried out under the $1,000,000 appropriation. Such supplemental amounts were $75,000 appropriated in June, 1934; $34,000 in March, 1938; and $50,000 in June, 1938.

Under cooperative construction, the expenditures by the other countries in many cases amounted to dollar for dollar on some of the large bridges requiring heavy foundation work, and some countries spent more than the United

(*Continued on page 44*)

Contractor's Plant For Asphalt Mixes

M. A. Gammino Constr. Co. Providence, R.I., Has a Well-Designed Compact Hot And Cold-Mix Asphalt Plant

(*Photo on page* 48)

✦ WITH highway contracts scattered through Rhode Island and southeastern Massachusetts, M. A. Gammino Construction Co. of Providence, R. I., installed a Cummer asphalt plant in the industrial section of Providence to serve both hot and cold-mix asphalt operations. All aggregates are delivered by truck from local quarries and pits while the asphalt comes in by tank car or truck, as seems more desirable. Asphalt storage is provided by four 10,000-gallon tanks with additional tanks of the same size for fuel oil and the naphtha flux for cold mix.

The plant is housed in a cinder-block and brick-column structure with a metal roof and is 50 x 150 feet in plan, with large entrances equipped with overhead doors at either end off center so that the plant is along one side of the building and the driveway for the trucks on the other. At one end is the oil-fired 90-hp Erie City Iron Works steam boiler and at the other, a separate one-story structure of similar construction containing the Fairbanks dial for the outside platform scales where all deliveries are weighed, the office, laboratory and toilet.

Aggregate Feed and Storage

A feed hopper over the lower end of the cold-material elevator is filled with the stone or sand as required by a Northwest crane with a 40-foot boom and an Owen ⅝-yard clamshell bucket. The material is moved from the hopper by an apron-type reciprocating feeder. A separate elevator is provided for the limestone dust used as a filler in sheet asphalt work. The limestone dust is carried to a hopper from which it flows to the same aggregate scales as are used for the other materials.

Drier and Dust Collection

The cold elevator delivers the material to the drier which is 50 feet long and 60 inches in diameter. It is a two-fire drier-cooler by means of which either hot or cold mix can be produced without any changes. The system is continuous and only one drier is used. No silos are required. A rectangular fire box near the end where the materials enter is heated by an oil burner which is the only one used when material is being dried for cold-mix operations. At the exit end is the second burner which is used with the supplementary burner when preparing material for hot-mix operation. The drier is driven by a 40-hp General Electric motor through belt and gear drive.

A forced draft pulls out the gases and vapor from the entrance of the drier through a MultiClone dust collector and thence through a Buffalo blower driven

(*Concluded on page* 41)

New Tube Packages For Lubricant Line

The new collapsible tube package of Lubriplate lubricants, recently announced by Fiske Brothers Refining Co., Newark, N. J., makes these lubricants available for economical application to a wide range of mechanical equipment, especially of the smaller sizes. Three of the more generally used Lubriplate products are regularly packed in this manner. The tube is fitted with a 1-inch extended nozzle which is convenient to fit filler openings in small gear casings, ball bearings, etc.

One of the three lubricants so packaged is Ball Bearing Lubriplate, especially prepared for all types and sizes of ball and roller bearings operating at speeds up to 5,000 rpm and temperatures to 340 degrees F. The second of these products is the No. 310, for use in gear cases of portable electric tools. It is stated that No. 310 will stand up to high-speed churning at elevated temperatures and will not leak out of the gear cases. No. 105 Lubriplate, the third in the set, is particularly designed for gear cases of motors exposed to wind, weather, and water, preventing rust and corrosion.

Further details on Lubriplate and these new packages of it may be secured by interested contractors and state and county engineers direct from the producer by referring to this item.

The EWC Handi-Dump cart.

New Hand Dump Truck For Cement, Concrete

The EWC ¾ and 1-yard Handi-Dump, recently announced by the Electric Wheel Co., Quincy, Ill., is designed to handle moderate loads of material, such as cement, aggregate or concrete, which are to be dumped. Of modern pressed-steel construction, these Handi-Dumps are built compactly for easy maneuverability, move freely on roller-bearing-equipped wheels, and dump clean on release of a latch, with no manual effort involved, and return to place automatically. A safety latch prevents accidental dumping.

The loading height of both models is 48 inches at the sides and lower in front, the body is 49 inches long and 48 inches high. The 1-yard unit is 46 inches wide and the ¾-yard model 36 inches wide. Wheels with Hyatt roller bearings and 10 x 3 molded-on rubber tires are standard equipment, or metal wheels are furnished as desired. Its capacity is up to 1,500 pounds for safe efficient dumping.

Further information on the EWC Handi-Dump may be secured by those interested direct from the manufacturer by referring to this item. Ask for Form A-682.

Attaching Signs To Concrete Posts

During a series of experiments and tests on various types of road-sign posts by a midwestern county highway department, during which it was decided to standardize on 9-foot concrete posts with metal signs, a new method of attaching the signs to the concrete posts was developed.

Holes were first drilled with a No. 14 three-pointed Rawldrill, then ¼-inch Stud Rawl-Drives were driven in, a certain type of fish oil first being freely applied to the exposed threaded portion of the drive, the nut and the Rawl Lok washer, and the cap of the Lok crowner as a preservative, in addition to the anti-corrosive coating with which these items are supplied.

After the studs were in place, the signs were placed in position, the Lok washers and nuts put on and tightened up. Then, to provide an attractive finish to the otherwise exposed nut, a Rawl-Lok crowner is slipped over the nut, giving a weather-proof, neat and attractive finish. These are the same type of Lok crowners as were used in the mooring mast tower of the Empire State Building in New York City to cover up the thousands of screw heads.

In the final test, before deciding upon the best method of attaching the signs, a heavy load of sand was suspended on the outer edge of the sign attached by the method described above, and swung back and forth to simulate wind action. Then a man applied his entire weight to the end of the sign with no degree of twist or change of position of the sign, it is reported.

These Rawl items used in attaching the signs are made by The Rawlplug Co., Inc., 98 Lafayette St., New York City, from which company complete information may be secured by state and county highway engineers referring to this item.

New Induction Motors

Leaflet GEA-3580, recently issued by the General Electric Co., Schenectady, N.Y., presents informative data on the design, construction, and application of its line of Tri-Clad motors. Particular attention is called to the motor's one-piece cast-iron frame and end shield for protection against physical damage; the stator windings of tough Formex wire for protection against electrical breakdown; and the new design of bearings for protection against operating wear and tear.

Copies of this leaflet, which is well illustrated with photographs showing construction features, the many types of Tri-Clad motors available, and some typical industrial applications, may be obtained direct from the manufacturer by mentioning this item.

Good Roads in Spring Depend on Winter Work

(*Continued from page 7*)

Minot and recrosses the international border in the east central part. It is a sluggish river, with a very low gradient and passes through many swamps where the adjacent bottom lands are only a few feet higher than the streams. The basin of the Souris River includes practically all of the Minot division with the exception of the southwestern area which drains to the Missouri River. The Continental Divide between the Hudson Bay basin and the Gulf of Mexico basin passes diagonally southeasterly and northwesterly through the division about midway between Minot and Max.

The North Dakota highway system is greatly over-expanded and adequate maintenance is extremely difficult. This state is thinly populated, and has a higher mileage of state and Federal highways per capita than any other state in the Union. This means that its highway work is spread over a large area. Minot is located at the hub of the system, with three U. S. highways converging on the city from six directions.

Handling Snow Problems

During the winter months local snowfalls are the general rule, with a general storm covering the entire division the exception. For this reason, we have found that small trucks of the 1½-ton class are most satisfactory, due to their speed and movability in getting from one storm area to another. Two highly important factors in selecting trucks for snow removal are speed and availability of repairs. Add to these desirable qualities their ability to find shelter in almost any town and you have a combination of features which make the truck and plow an independent unit.

We do not attempt to function without heavier equipment, but light to moderate snow can be handled most efficiently with light fast truck plows of either the V or one-way type. For operation during storms and at night, running the plows in tandem is most successful. In case of trouble with one unit, the other is close at hand to render such assistance as may be necessary.

The Minot Division has three 1½-ton-truck V-type snow plows, two 1½-ton-truck one-way plows, and three 3-ton all-wheel-drive V-type plow units. Our heavy equipment consists of one 8-ton four-wheel-drive truck with V plow and wing, one 10-ton four-wheel-drive truck with V plow and wing, and one large rotary plow. In addition to the truck plows, we have six heavy-duty power patrols equipped with small V-type plows. These patrols are strategically located at remote points in the division and are commonly used for ridging snow in fields parallel to the roads to intercept the movement of the snow.

Two high-pressure boilers are constantly on the road to keep culverts open during the break-up. Repair crews are assigned to sections for the purpose of catching immediately any small failures in the surface. Treatment of frost boils with calcium chloride in the autumn has greatly reduced their menace at the break-up.

Costs and Results

During the winter of 1940-41 the western half of this division was practically free of snow, while the eastern half was affected by numerous local storms as well as the general storms. The average cost of maintaining the roads affected was approximately $60.00 a mile.

As evidence of the feasibility of following the foregoing procedure during the break-up, it was unnecessary to place load limitations on any of the roads in the Minot Division this past spring.

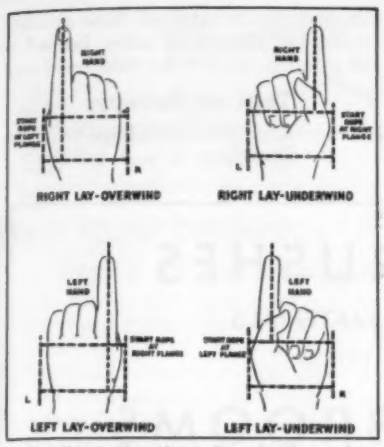
Material-Handling Units

The line of loading, elevating and conveying machinery made by the General Conveyor & Mfg. Co., Broadway & Wisconsin Aves., St. Louis, Mo., is described briefly and illustrated in its new general folder. This equipment ranges from small self-propelled crawler-type bucket loaders capable of handling ¾ to 1 yard of clay, gravel, sand or stone per minute to large continuous elevator and shuttle belt conveyors for use at sand and gravel plants.

Copies of this general folder or more complete data on a particular piece of equipment may be obtained by writing direct to the manufacturer.

Two New B-E Dealers

The Bucyrus-Erie Co., South Milwaukee, Wis., recently appointed the Industrial Tractor & Equipment Co., Inc., Baton Rouge, La., and the East Coast Equipment Co., Inc., Miami, Fla., as distributors for B-E ⅜-yard to 2½-yard shovels, draglines, clamshell and lifting cranes in their respective territories.



Simplified directions for starting wire rope on a drum.

Drum Reeving Rule Is Now Simplified

In order to secure the maximum life from wire rope, it is important that the rope be properly started on the drum. If started at the proper flange, the rope will wind with the wraps tightly hugging each other and in such a manner that there will be no space between wraps into which a wrap from above might squeeze and cause serious scrubbing, scarifying or binding. If a rope is not to damage itself prematurely, the wraps must lie close together.

To reduce the tendency for rope to spool unevenly, many users are employing the preformed type, since in the manufacture of this type of rope internal torsional stresses are practically eliminated. One result of preforming is to make the rope resist rotating when passing over drums and sheaves. This resistance to rotating, whipping, and its freedom from "crankiness" permits preformed rope to spool much better.

The rule, a rather complicated one, for winding the rope on the drum is as follows: When a right-lay rope is being underwound on the drum (in other words when it leads from the bottom of the drum), start it from the right flange, looking at the drum from the rear. If it is a left-lay rope, start it from the left flange. Conversely, if a right-lay rope is being overwound (that is, if it leads from the top of the drum), start it from the left flange. If it is a left-lay rope, start it from the right flange.

A simpler way of remembering this rule is to use your doubled-up fist to represent the drum and the index finger to indicate the flange. With right-lay rope use the right fist and with left-lay rope, the left fist. For overwound rope, keep your fist back up and for underwound rope, the palm up. Pointed to the drum, the index finger will indicate both how the rope should lead from the drum and from which flange. The accompanying illustrations, furnished through the courtesy of the American Cable Division, American Chain & Cable Co., Inc., show how easily this rule may be applied.

Small Dirt Scraper For Wheel Tractors

The Stockland Hydro-Scoop, made by the Stockland Road Machinery Co., Minneapolis, Minn., is a small dirt-moving scraper designed particularly for use with Minneapolis-Moline wheel tractors on roadside development jobs, highway shoulder work, ditching, terracing and landscaping. It is stated that the Hydro-Scoop will dump anywhere, moving forward or backward, on the level, over a bank, or up on a stockpile, and it will spread while dumping.

The Hydro-Scoop one-man hydraulically-operated earth mover consists of a rugged steel riveted and welded frame and a strong durable scoop with a detachable reinforced cutting edge. The scoop has ball and socket bearings, equipped for Alemite lubrication, and will handle from 7 to 10 cubic feet of dirt. The shovel has an adjustable pitch for hard or loose dirt, and is easily detached or attached by one man. Operation is under control at all times by means of the hydraulic lift and a cutting depth of from 1 to 12 inches below the tractor wheels may be obtained.

Further information on the Stockland Hydro-Scoop is contained in an illustrated bulletin, copies of which may be secured by contractors and state and county highway engineers direct from the manufacturer by mentioning this item.

New Dodge Asst. Sales Mgr.

Announcement has been made by the Dodge Division, Chrysler Corp., of the appointment of Allison Miller as Assistant Sales Manager of the Dodge Truck Division. Mr. Miller, who joined the Dodge organization in 1925, has previously served as Regional Manager in the Philadelphia and St. Louis territories.

New Type of Cement For Scale Resistance

Tests Indicate That New Substance Added to Cement in Manufacture Reduces Scaling of Concrete

✦ MODERN high-speed travel on highways has led to a demand that roads be kept open and free from ice and snow. While this requirement is met through the use of ice-removing salts, it has become evident that the compounds used, either alone or aggravated by traffic wear, have a marked accelerating effect on the deterioration or scaling of concrete highways caused by alternate freezing and thawing. So great has this scaling become that many sections of concrete road in the north have required resurfacing or replacement.

Cement manufacturers and highway departments early recognized this problem, and undertook investigations leading towards a successful solution. It was obvious that ice on roads is a serious traffic hazard, and that its prompt removal is important. Compounds used for this purpose not only were shown to accelerate the effect of each freezing-thawing cycle, but their use resulted in many more cycles than would occur if the ice-blanket were left undisturbed on the surface. Thus, any weakness in the concrete, due either to a weak mortar surface from over-finishing or to inferior sand or improper aggregate, would be greatly aggravated, and scaling would be caused both by accelerating the attack and by intensification of mechanical failure.

Early in the investigational work it was found that one particular brand of cement showed increased resistance to accelerated freezing and thawing tests in calcium-chloride solution. Further investigation of this phenomenon led to the belief that a small amount of grease or fat which could be extracted with ether from the cement was the cause of this improvement. A search was made for other similar materials which could be added during grinding of the clinker and which would be more effective in reducing the concrete's tendency to scale.

In one of these test programs, conducted by the research laboratories of a leading cement company, small slabs were made of various portland cements, portland-natural cement mixtures, and special laboratory cements. These slabs were stored outdoors and their top surfaces subjected to the natural freezing of water restrained by dikes, followed by thawing with calcium chloride. In a short time, all slabs began to scale except those of the portland-natural cement blend and one laboratory mix plasticized with a small amount of cod-fish-oil stearate. Upon completion of the test, the fish-oil stearate slab proved much more resistant than the portland-natural mix which had shown such improvement over regular cement in tests by New York State's Highway Dept.

Resin Does It

Predicated on the behavior of these two slabs, and on the fact that they contained more entrained air than any of the others, tests were made of many materials which would entrain air, and Vinsol resin, a naval stores product of uniform quality and low cost made by Hercules Powder Co., was selected as the most promising material for this purpose. Subsequent testing confirmed the inference that entrainment of air had some direct connection with scale-resistance. Slabs containing either Vinsol resin, fish-oil stearate, or cod oil do not scale on repeated freezing and salt-thawing, and 2-inch cubes of these mortars, frozen and thawed in water instead of salt solution, showed the same resistance.

Tests on Highways

These small-scale tests have been con-

(*Concluded on page 43*)

The new Ransome Hi-Up truck mixer.

New High Discharge Truck Mixer Feature

A higher point of discharge and several improvements over present models are the features of the new Ransome Hi-Up truck mixer just announced by the Ransome Concrete Machinery Co., Dunellen, N. J.

According to the manufacturer, the Hi-Up drum rollers are placed under the center of gravity of the drum, practically balancing the load and relieving the strain on the front pedestal bearing. This provides the machined drum track around the center of the drum which tends to act as a reinforcing band where the impact of the intake load is the heaviest and eliminates the long span of light-steel drum shell where the drum track is at the discharge end of the drum and the pedestal bearing at the front. All operating parts are readily accessible.

Because there are no drum rollers at the discharge end of the mixer, the mixer frame is shorter; also because there are no supporting members required for the drum rollers at the discharge end of the mixer, the Hi-Up may be backed closer to forms and discharged without the use of a chute, according to the manufacturer, although a two-piece chute is standard equipment. The Hi-Up is designed for combination top and end loading.

Complete information on the new Hi-Up truck mixer and the sizes in which it is available may be secured direct from the manufacturer.

Lake Mead Reaches New High

Lake Mead, the giant lake created by Boulder Dam, has filled for the first time, reaching a new high level of 29,000,000 acre-feet, the Bureau of Reclamation has announced. Late snows in the high mountains of the Colorado River watershed have altered conditions to such an extent that it is expected Lake Mead will overflow over the spillways of Boulder Dam for the first time this year.

Pavement Thickness And Subgrade Support

In Bulletin No. 8 of the Research Series of The Asphalt Institute, the subject of the required thickness of asphalt pavement in relation to subgrade support is discussed by Prevost Hubbard, Chemical Engineer, and Frederick C. Field, Chemist, both of The Institute. In view of the large amount of reconstruction necessary on the strategic network, this subject is of particular importance and interest to highway engineers.

Copies of this Bulletin No. 8 may be secured by those interested direct from The Asphalt Institute, 801 Second Ave., New York City.

Hydraulic-Control Shovel Described in New Bulletin

In a bulletin just released by the Harnischfeger Corp., Milwaukee, Wis., the P & H Model 855 shovel with its new hydraulic control system is described in detail. The simple low-pressure hydraulic control system used on the Model 855 is based on the same principle used for the past 15 years in the automotive industry. According to the manufacturer, this system not only eliminates operating losses but is so responsive that the operator is able to "feel" the load at all times.

Further details on this shovel, which can be quickly and simply converted to dragline, crane or clamshell, may be found in the illustrated Bulletin X-20-1. Copies may be obtained by writing direct to the manufacturer.

Drag Brushes and Brooms For Use on Highway Jobs

Lay drag brushes for highway work are made of one-piece solid maple or elm blocks into which the wire is fastened by a heavy wire staple to insure permanency of position. Each block has a full number of holes per row and the wire projects 5½ inches from the face of the block. Other specifications depend on the requirements of the purchaser and the work to be done.

Rotary brooms, also made by this company, for removing excess dirt and dust from the grade during construction, are made of southern hickory fibre or steel wire if desired.

Full details and prices on Lay brushes and brooms for highway work may be secured direct from the Joseph Lay Co., Inc., Portland, Ind., manufacturer of all types of brooms since 1876.

Coulee Now Cool Enough

The task of cooling the 10,250,000 cubic yards of concrete in Grand Coulee Dam is now complete, according to a recent announcement by the Bureau of Reclamation. The job required two large barge pumps, 2,000 miles of pipe, 2 miles of 3½-foot inspection shafts, nearly 6 miles of galleries and other shafts, and five years, and it cost about $1,400,000.

This pumping system, circulating cold river water through steel tubing embedded in the dam, reduced the concrete temperatures from as high as 132 degrees to the uniform temperature of 45 degrees required by the engineers. It rquired 60 to 90 days of circulation of the cold water to cool the concrete in each section. Engineers calculate that the entire mass of concrete would not have cooled through ordinary radiation for a century.

Promotions at Chain Belt

Announcement has been made by the Chain Belt Co., Milwaukee, Wis., of the appointment of D. A. Kalton and A. W. Thomas as Assistants to the Sales Manager of the Construction Equipment Division. This Division manufactures Rex concrete mixers, Moto-Mixers, concrete road pavers, centrifugal water pumps, and the Rex Pumpcrete unit.

Gravel Mix Improves Old Mass. Town Road

(*Continued from page 2*)

oughly curing.

The Town Gravel Plant

Formerly the Town used to move its portable gravel plant around from one pit to another, but that proved expensive when the cost of moving the plant was added to the cost of leasing the pit. Recently a large pit was purchased by the Town, and a Cedar Rapids No. 916 portable gravel crushing plant was installed, with a conveyor delivering the product to a large bin from which the trucks are loaded. The plant is fed with gravel by a ¾-yard Pioneer dragline bucket operated by a National 2-drum hoist.

The Road-Mix Operation

The gravel from the Town plant, having a maximum 1-inch stone, was spread from the tail-board of the truck with the board chained to give a uniform spread. The haul from the plant to Highland Street, where the operation described was carried on, is about 16 miles, requiring the use of six Town-owned Ford, Chevrolet and Dodge trucks. Hauling was started on a Monday morning, and the tar was on and mixing had been started by Thursday afternoon.

The gravel was spread the full 18-foot width of the road to a depth of about 2½ inches loose. In order to incorporate the new gravel spread on the surface with the base material, a 12-foot International springtooth harrow in two sections was pulled through by a truck. This loosened up the material which had been somewhat compacted by the traffic using the road during the spreading operation.

The gravel was shot with two applications of 0.4 gallon of tar per square yard for the full 18-foot width, using Tarvia filling the Massachusetts specification T6 for 24-60-viscosity tar. The first application was then harrowed thoroughly to mix it and the second application made and harrowed. The harrowing was continued Thursday afternoon, after all of the tar had been applied, and all day Friday. It was found that this operation makes it much easier for the grader to mix the aggregate and binder, as it aerates the material and starts curing.

A hired Allis-Chalmers power grader with a 10-foot blade started working at 10:30 a.m. on Friday, operating for 7 hours, first mixing the material and then windrowing it at the side of the road at the end of the day. Starting again Saturday morning, the grader continued mixing for 7½ hours. An interesting variation of the usual mixing operation is used by the Town of Middleboro. The grader is run forward and backward with the blade working on the material both ways. The backward motion gives a kneading action that breaks up any lumps which would ordinarily continue rolling ahead of the grader if worked only with the front of the blade. The grader, hired from Thomas Bros. of Middleboro, has mechanical control and dual drive on the four rear wheels, with a 22-hp engine. The mixing blade is specially curved to give a good throw and mixing action.

C. & E. M. Photo

The Cedar Rapids portable crushing plant used by the Town of Middleboro, Mass., to supply aggregate for its road-mix operations.

At the end of work on Saturday, the material was windrowed at the side of the road until Monday, one week from the start of the operation. On this second Monday, the material was worked again. Spreading began at 10 a.m. and continued until 3 p.m. As soon as the material was spread, it was rolled with a 12-ton Buffalo-Springfield roller but, in order to prevent sticking, it was very lightly sanded before the roller started operations. When the rolling was completed, the road was left from 20 to 30 days before sealing.

Sealing the Surface

A truck-drawn rotary broom was used to clean the surface thoroughly before the seal of 1/3-gallon per square yard of Tarvia meeting Massachusetts specification T6 was applied at 130 degrees F. This was immediately sanded by hand from stockpiles at the side of the road. In order to secure as uniform a distribution of the sand as possible over the surface, a special drag broom, built of Kinney steel brooms and attached to an old grader frame so that the pressure and position of the brooms can be changed at will, was pulled over the surface by a truck. When this work was finished, the job was complete and traffic allowed to have the road to itself.

The work was done under the direction of Paul F. Anderson, Superintendent of Streets, Town of Middleboro, Mass. Edward C. Peterson is Town Manager.

Convertible Chassis For Vibrating Sets

One of the features of Marvel gasoline-engine-driven concrete vibrator sets is the convertible chassis which makes possible the conversion of the standard carrying model to wheelbarrow mounting when desired. These vibrators, available in four models, with 2½, 3½ and 4½-hp engines and 1⅝, 2⅜, or 3-inch vibrator heads, are equipped with 7, 14, 21, 28, 35 or 42 feet of drive shaft, in multiples of 7 or 14-foot sections. Power is furnished by standard Wisconsin or Briggs & Stratton air-cooled single-cylinder four-cycle engines, with flyball-type speed regulator, and rope starter, mounted on a swivel base with a helper wheel.

Further information on these Marvel vibrators may be secured by those interested direct from the Marvel Equipment Manufacturers, Inc., 224 So. Michigan Ave., Chicago, Ill., by mentioning this item.

Medial-Strip Planting Should Promote Safety

(Continued from page 15)

maintenance cost must be allowed for such plantings to replace damaged material. As for trees, these are fixed objects which themselves may be hazards to traffic forced off the pavement and into them. Low-headed tree types, the branches of which tend to spread out over several feet, are likely to encroach on the area reserved for traffic. In a relatively narrow medial strip only 9 to 11 feet wide, the placement as well as the maintenance of trees and shrubs is likely to be a hindrance to traffic.

In such limited widths of medial areas it is possible to make use of a more flexible or vine-type of plant material as a ground cover. Low-growing roses, such as the wichurianas, the wichuriana hybrids, the multifloras and the setigera species, are ideal for such purposes. These roses, unlike the stiff erect type of plants, have a sufficiently adaptable and flexible growth to recover satisfactorily from the effects of traffic damage.

While required sight distance at intersections may be kept open through the use of this low-growing plant material, it is possible by a careful design and selection of species to get sufficient height and proper placement of material so that headlight glare may be reduced at critical points. With proper advance soil preparation at the time of installation and mulching after planting, ground cover growth of this type is very effective in appearance at all seasons of the year and is relatively easy to maintain under average conditions. For the driver behind the wheel of a car, the contrasting planting greatly aids in outlining the edge of the surfacing both day and night.

Where the graded slope of the medial strip falls away sufficiently from the edge of the pavement to lose the effect of a shoulder width, it is desirable to protect the planting with some appropriate guard-rail installation. This auxiliary construction will delineate the edge of the surfacing as well as prevent the high-speed traffic on the upper level from running off over the slope down upon the lower level of opposing traffic.

For this section of U.S. 40 in Ohio, it has been decided to use guard rail, with medium high planting on all sections where there is a change in grade

Public Roads Administration Photo

This type of ground-cover planting is particularly adaptable to medial strips.

of the two lanes. Where there is no grade change, low mat plant materials will be used, with reflectors. The left-hand edge of the old pavement will be marked by a traffic stripe. A complicating factor in this particular project is that when the south lane of this route is rebuilt, as will be necessary in a few years, it will conform in grade to the present new lane and therefore it did not seem advisable to spend too much money for what will be a more or less temporary planting. However, in the opinion of the Department of Highways engineers, the expenditure would be well worth while if one life is saved as a result of these safety measures.

Summary

This analysis of the problem of headlight glare on highways separated by a narrow medial strip was made by the Coordinating Committee on Roadside Development of the American Association of State Highway Officials and the Highway Research Board, of which Wilbur H. Simonson, Senior Landscape Architect, Public Roads Administration, is Secretary. Dallas D. Dupré, Jr., Landscape Architect, Ohio Department of Highways, is Coordinator for District No. 10 comprising Pennsylvania, Maryland, Delaware and Ohio.

The joint opinion of this group, after inspecting the problem on U. S. 40, is that to reduce driving difficulty and traffic hazard on narrow separations of divided highways, it is fundamental that the treatment make the edge of old road surfaces more definite and visible to the driver of a motor vehicle. The use of a painted stripe of highly contrasting color along the edge of the older surfacing adjacent to the medial strip may be the first step in the effort to overcome or offset the failure to provide a normal shoulder width during the stage-construction period of development of the divided highway. Where the surface of the medial strip is below the road surfacing, the installation of a satisfactory type of guard rail may be required. The newly graded surface of the medial strip should be protected by the planting of a suitable ground cover which will aid further in defining the edge of the surfacing and serve as an effective aid in reducing headlight glare.

The point of view of the driver behind the wheel should be the controlling factor in the design and selection of treatment to be used in medial areas. Careful analysis is therefore necessary so that the medial strip may reduce driving difficulty and hazard. The width and type of medial strip, whether it is a raised or depressed center, with or without curbs; the sight distance required at intersections in terms of the speed of traffic movement; and other related road and traffic conditions all have a bearing on the design treatment for the surfaces of medial areas.

Use of Rubber Tracks Outlined in Bulletin

A new bulletin that illustrates the commercial applications of rubber tracks, apart from their use on crawler-type military vehicles, has recently been issued by the B. F. Goodrich Co., Akron, Ohio. Combining the long life and durability of rubber with the reinforcing strength of steel, the rubber tracks have varied adaptation for use on industrial, commercial and agricultural vehicles. They are available in two types; an endless-band track reinforced longitudinally with steel cables to which transverse driving members are bonded at accurate intervals, and a rubber block track of individual segments that may be removed and economically covered with new rubber.

Those interested may obtain copies of this bulletin by writing direct to the B. F. Goodrich Co.

Hot or Cold Mixes Produced at Plant

(*Continued from page* 32)

through V-belts by a 40-hp Westinghouse motor. This discharges into an outside tower equipped with a water spray from a deep well which removes all of the dust from the air before it is finally discharged in the open. The dried material from the rotary drier is delivered to the hot elevator which raises it to the top of the plant and discharges into a rotary screen. The screened materials are delivered to a 4-compartment bin.

The Asphalt System

The asphalt flows by gravity from the steam-heated outside storage tanks to the superheating kettle of 3,000-gallons capacity located inside the plant immediately in front of the steam boiler. From this kettle the asphalt is picked up by a Kinney asphalt pump and circulated continuously through a loop from which the asphalt for the batches is drawn into an asphalt weigh bucket. The asphalt lines are all steam-jacketed to maintain the asphalt at its maximum temperature at all times. A second Kinney pump handles the naphtha for fluxing the powdered asphalt for the Colprovia mix for which this contractor is the district agent.

At the operator's position, where all aggregates and asphalt are weighed, there are two 3-way valves, the operation of which makes it possible to shift almost instantly from handling hot asphalt to handling the flux for the powdered asphalt. Between these 3-way valves is a single valve which controls the discharge of either the hot asphalt or flux from the loop connected to that valve.

The powdered or pulverized asphalt for the Colprovia is produced in a small pulverizer outside the building and blown to a storage hopper. From this hopper it is again blown to a small weighing hopper connected to Kron dial scales while the fluxing material is weighed in the regular asphalt bucket.

Weighing and Mixing

One Kron dial scale is attached to the aggregate weigh bucket and by step-weighing it is possible to weigh all of the aggregates in this one hopper. As mentioned above there are two asphalt scales, one Kron dial scale for the hot asphalt and for the flux oil for the Colprovia mix, and another Kron dial and bucket for the powdered asphalt.

The aggregates and the asphalt for either the hot or cold mixes are delivered to the 3,000-pound batch Cummer pugmill which is driven by a separate 75-hp Westinghouse motor. The gates which release the mixed batches around the pugmill are operated by steam pistons.

The powdered asphalt grinder and blower is a hammermill unit driven by a 40-hp General Electric motor through a group of V-belts.

Personnel

This efficient asphalt plant has a capacity of 320 tons of sheet asphalt in eight hours or 60 tons per hour when mixing binder. When operating on Colprovia mix its capacity is between 40 and 45 tons per hour. The longest haul for hot batches mixed at this plant was 35 miles to Point Judith beyond Narragansett Pier, R. I. All truck bodies are oiled before loading with the hot mix and before every second or third load when hauling Colprovia.

The hot and cold-mix asphalt plant of M. A. Gammino Construction Co. of Providence, R. I., is operated by Ira Edgerton as Superintendent, under the direction of Frank Gammino.

C. & E. M. Photo
Pulling in a load of sand and gravel from the wet pit at the Providence Forge set-up of the Virginia Department of Highways' aggregate plant.

Aggregate Plant Operated by State

Well-Planned Small Plant Washes and Screens Gravel And Sand for Maintenance In Richmond, Va., District

(*Photo on page 48*)

✦ SINCE February, 1936, the Virginia Department of Highways has operated a sand and gravel washing and screening plant at a leased 12-acre sand and gravel pit near Providence Forge, about half way between Richmond and Hampton, Va., on the peninsula. The operation of the plant is under the Maintenance Division of the Richmond District, and the owner is paid an agreed fee per cubic yard of material removed. In addition to gravel for surface-treatment operations in the District, sand has been furnished for the portable asphalt plant set up by a contractor near the pit (C. & E. M., April, 1941, page 11).

The Plant

Ground water level being some 8 to 10 feet below the surface of the ground, material from the wet pit is handled by a bottomless drag bucket operating out to about 400 feet from the feeding hopper. Excavation is carried to a depth of about 18 feet below ground level. The material is delivered by a feed hopper to a 40-foot conveyor with an 18-inch wide belt, then to a 9 x 24-foot double-deck eccentric shaker screen with ¾-inch screen cloth on the top deck and ¼-inch cloth on the bottom deck, and finally directly to two bins from which the trucks are loaded.

The entire plant is operated by a 75-hp Climax gasoline engine which drives a main pulley in the center of a shaft with a smaller pulley on each side, one driving a 4-inch centrifugal pump to furnish the water for washing the aggregate and the other driving the American Hoist & Derrick double-drum hoist which operates the drag scraper.

The plant is operated 8 hours a day and has a regular production varying from 80 to 110 cubic yards.

Personnel

The laborers at the feed hopper, one man on top at the screens and one man for the hoist work under the direction of W. H. Barry, Superintendent of the plant.

Heavy-Duty Wellpoints

A new heavy-duty wellpoint, designed for capacity and economy, has recently been announced by the John W. Stang Corp., 2 Broadway, New York City. A feature of this wellpoint is its all-brass jacket design to reduce the clogging hazard to a minimum even in the finest soils. For coarser soils, a wire mesh screen with a perforated brass jacket is used, while a special tubular slotted jacket is provided for the very fine sands.

Installation to any point below the subgrade is quick and easy, according to the manufacturer, by using a Stang Hi-Pressure pump, as the water is jetted through the double orifice in the point controlled by a single ball valve. The head of the wellpoint has cutting edges of hard-alloy metal to dislodge gravel or other obstructions as it is installed.

Further information on the Stang wellpoint system is contained in a new bulletin, copies of which may be secured direct from the manufacturer by mentioning this item.

AGC Reviews Defense Construction Problems

Members of the governing and advisory boards of the Associated General Contractors of America held their spring meeting at White Sulphur Springs, W.Va., last month. They reviewed the progress in national defense construction, considered the problems to be met in the $10,000,000,000 construction volume for the year, agreed that the general contracting industry can be proud of the part it has played in defense, and resolved to do even better in the future.

It was recognized that there are three important jobs in the future for the industry. The first is to execute the huge volume of national defense construction ahead with the maximum of speed, efficiency and economy; the second is to inform the public of how the construction industry is performing a vital and indispensable function in the defense program with the speed, efficiency and economy possible from no other source; and third, to lay plans now for the construction industry to do its share in meeting the employment problems which will follow a decline in defense production.

Facts were presented to show that during the year enough construction will be started to keep the majority of contractors, large and small, busy. It was pointed out that the construction industry has the capacity to handle all construction likely to develop during the year, provided the programs about to get under way are handled without confusion, and so that the facilities of all contractors can be used.

Action was taken to encourage local chapters to cooperate with local officials and civilian defense groups in order to coordinate the work of contractors with these civilian defense construction activities.

Serious consideration was given to the problems facing construction for the year. A motion was adopted directing the A.G.C. staff to seek elimination of the "recapture clause" from War Department cost-plus-a-fixed-fee contracts. This clause for the government taking over the contractor's equipment is not contained in Navy Department contracts.

Detroit was tentatively selected as the place for the fall board meeting, and Seattle as the site of the 1942 convention. These selections were made tentative pending future national and international developments which might require sites less distant from Washington.

New Diesel Engines For Chevrolet Trucks

Hercules diesel engines fully engineered for Chevrolet trucks are now available for both the conventional and cab-over-engine types of 1½-ton chassis for 1940 and 1941. This is the same engine used by General Motors Overseas Operations in diesel-powered Chevrolet trucks for export. While this manufacturer does not offer diesel-powered Chevrolets for the domestic market, these diesel replacement units made by the Hercules Motors Corp., Canton, Ohio, are available through Chevrolet dealers as well as from distributors handling the Hercules line of engines.

The main advantage to be gained from diesel operation is the reduction in operating costs made possible by the use of diesel fuel. Another advantage is the fact that diesel-powered trucks may be used in tunnels and similar underground construction where gasoline-powered equipment is not permitted because of the fumes. It is also stated that the operating radius of the diesel-powered truck is about 1½ to 2 times the mileage of gasoline-engine-powered trucks of the same size and type handling the same loads over the same roads.

Further information on these Hercules diesel replacement units may be secured direct from the Hercules Motors Corp. or from the nearest Chevrolet dealer.

Elevator Buckets

A new folder, No. 1912, on Link-Belt malleable iron and Promal elevator buckets has just been announced by the Link-Belt Company, 220 So. Belmont Ave., Indianapolis, Ind. This folder covers complete data on elevator buckets for general service.

New Product Reduces Scaling of Concrete

(*Continued from page 36*)

firmed, during the past three years, by an experimental concrete road at a plant of a leading cement company, by extensive tests at the Albany laboratories of the New York State Department of Public Works, by some twenty-odd test roads in twelve states, and by the use of Vinsol-treated cements in many miles of new highway construction. During the course of this work, many additional facts of importance have come to light with regard to the value of these cements in all types of concrete construction.

Significant facts about cement treated to decrease scale-resistance may be briefly summarized as follows: optimum results are obtained with a definite small amount of the resin (0.03 to 0.05 per cent, depending on the composition of the cement); the detrimental effects of inferior sand are reduced when this resin-treated cement is used; such treated cement shows a definite reduction or elimination of segregation of water, mortar or aggregates, and thus will aid in preventing scaling due to segregation from over-working as well as that due to the accelerating effects of chlorides or to the use of inferior sand. Concrete made with resin-treated cement is "fatter" and more workable. Strength of the concrete is slightly reduced, but in applications where this factor is important, the improved workability permits a reduction in the water-cement ratio which tends to offset the loss in strength.

Practical evaluation of this resin-treated cement in actual construction has brought out these points of direct interest to contractors. No change in equipment is necessary, nor is it desirable. The special cement is used exactly as regular portland, except that mixing water may be reduced up to 10 per cent. And, since the resin is a low-cost material and as the quantity used is only a few ounces per 376-pound barrel, the cost of the resin addition is only a fraction of a cent per barrel.

Resin-treated cement, in comparison with ordinary portland, shows increased ease of placeability and workability, and a sharp reduction in segregation of aggregate, "bleeding", and the formation of mortar-pockets. In large-scale road construction tests, this has allowed the finishing crews to work closer to the mixing and placing operations.

The finishing crew is often only a half hour behind the mixer at the end of an 8-hour pour, instead of being 5 to 6 hours behind. In fact, it is reported that many contractors who have laid roads in which resin-treated cement was used on one section have asked permission to complete the construction job with the treated cement, because of the greater ease of placing and speedier finishing.

Conclusion

While work is still going forward on the evaluation of this scale-resistant cement in many localities, enough data has been collected from both laboratory and field to permit the conclusion that cement containing Vinsol resin, added during clinker grinding, will definitely reduce surface scaling. One series of tests is typical. In this, normal portland cement was found to scale from 65 to 85 per cent of the total surface. Adjacent sections, made with resin-treated cement, showed from 0 to 5 per cent scaling under exactly the same conditions. All types of scaling are apparently reduced equally, whether the cause is salt, inferior sand or surface segregation due to overworking. Contractors and highway engineers are as interested from the standpoint of lowered placing and finishing costs as they are in the better surfaces and lower resurfacing and replacement costs which result.

Reo Personnel Changes

A number of appointments in Reo sales personnel has recently been announced by the Reo Motor Car Co., Lansing, Mich. Herman Dorn, in charge of the Milwaukee branch for the past 3 years, has been named Manager of the Dallas branch, while T. A. Kennedy, formerly District Representative in the Wisconsin and Minnesota territory, succeeds Dorn at Milwaukee. R. C. Unger, formerly District Manager of the eastern territory, has been appointed Manager of the Pittsburgh Branch.

Thomas Bates has returned to Reo after a 3-year absence to handle special work on prices, specifications and general sales data, and Marvin Frier has been appointed Service and Parts Manager of the Chicago branch.

Five Types of Couplings Described in Bulletin

The Falk Corp., 3001 W. Canal St., Milwaukee, Wis., has recently issued a bulletin fully illustrating and describing the outstanding features of five types of Falk Airflex couplings. These couplings, according to the manufacturer, have been developed especially to protect machinery from impacts resulting from the irregular torque characteristics of the prime mover or the driven machine. They have proved to be suited for connecting diesel, oil, gasoline, or gas engines to any type of driven equipment, as well as for use between motors and compressors, single-cylinder pumps and other driven equipment having high fluctuating torque characteristics.

This bulletin, No. 8100, contains typical installation views, a complete discussion with example illustrations of the Airflex coupling "Rubber Loading In Shear" principle, dimension drawings and tables of each type of coupling, and an easy-to-follow section on how to select Falk Airflex couplings. Copies may be obtained from the manufacturer.

Public Roads Administration Photo
The Chiriqui Bridge in Panama, one of the first bridges completed on the Inter-American Highway.

Highway to Panama Progressing Steadily

(*Continued from page* 31)

States. Approximately 75 per cent of the $1,000,000 U. S. appropriation was expended for American equipment, materials, services and personnel.

The work carried out with this $1,000,000 appropriation furnished valuable examples of both design and methods of construction, and the highway programs throughout Central America were substantially encouraged and promoted. The use of American engineering practice, equipment, and methods of construction was introduced and demonstrated, and an impulse to continue road construction given to all the countries concerned.

Standards for Work

Standards of construction can not be made entirely uniform throughout the length of the highway. Each country is obviously at liberty to continue building within its own jurisdiction with its own funds as it is able, and such expenditures are in no sense under the control of the United States government or its agencies. Whenever funds of the United States are used, however, the surveys and plans are subject to the approval of the Public Roads Administration and uniform standards appropriate for the highway are followed.

Maximum grades are 6 per cent, except under certain special conditions. The cross section provides for a 6-meter (approximately 20-foot) surface and a 10-meter (about 33-foot) grade. Curvature follows the rules for parkways and park roads as developed by the P.R.A. for use in mountainous park areas. Minimum radius is 150 feet where fills are on the inside of the curve, and minimum sight distance on vertical curves is 350 feet. All bridges are designed for H-15 S-12 loading.

In some countries, as in Mexico, the standards have been advanced on parts of the work where conditions are favorable. Where surveys have been made by Public Roads Administration engineers, transition curves have generally been introduced.

The type of surfacing obviously varies with the funds available. It is more important to complete a through connection between principal objectives than to provide at once a high type of construction. There are sections of concrete pavement up to 80 miles in length. There is a stretch of penetration macadam approximately 900 miles long in Mexico and another 80 miles long in El Salvador. Throughout Guatemala the road is surfaced, with little variation, with volcanic materials consisting of broken lava rock, volcanic tufa and other selected materials of similar origin. Some river and some bank gravel is used where available, but for the most part, especially under the Export-Import Bank loans in Costa Rica and Nicaragua, crushed rock and a penetration asphaltic surface are specified.

The principal aim is to establish a satisfactory line and grade which will be usable as the road continues to be improved, and to make the initial surface adequate to support traffic during the entire year, in both wet and dry seasons.

Progress Made

The current interest of the Central American countries in completing the highway is indicated by their action in providing for construction. In 1936, under President Cardenas, Mexico set up a program to complete the road southward from Mexico City to the Guate-

(*Concluded on next page*)

New Armco Steel Plant

Adding a new basic industry to the Southwest and another strong link in the chain of national defense, ground was broken recently for a new $17,000,000 steel plant in a 600-acre site on the ship canal near Houston, Texas, by George M. Verity, Chairman of the American Rolling Mill Co., Middletown, Ohio. It is expected that the plant, which is being built for the Sheffield Steel Corp., an Armco subsidiary, will be in operation early next year.

Further U. S. Aid for Inter-American Route

(*Continued from preceding page*)

mala line by the end of 1940. This program was too ambitious, considering the heavy and difficult construction on parts of the route, and has not been completed although it is advancing steadily. The international bridge at the Suchiate River has been finished in cooperation with the government of Guatemala and both approaches reconstructed for several miles.

In El Salvador the very systematic program for paving the entire longitudinal road is progressing with almost machine-like regularity. The design is good, betterments in grades and curvature have been made in the old sections west of San Salvador and at present a major bridge at the Lempa River is under construction at a cost of approximately half a million dollars. Paving will probably be completed eastward to San Miguel within the current year.

In Nicaragua the extension of credit made by the Export-Import Bank in Washington in 1939 provides for the completion of about one half of the mileage across the country. This program is proceeding smoothly and very efficiently and a second extension of credit has been favorably considered to complete the road to the Costa Rica line and possibly to the border of Honduras, via Esteli. The credits supplied for roads amounts to $3,700,000 and the Nicaraguan government maintains a Cordoba account for the payment of local labor and the purchase of local materials.

Costa Rica has recently arranged for credits amounting to $4,600,000 through the Export-Import Bank and expects to build the entire section between Cartago and the Panama frontier. This gap of approximately 150 miles is the longest and most difficult of the unconstructed sections of the highway south of Mexico.

Today approximately 60 per cent of the distance from Laredo, Texas, to the Canal consists of road passable in all weathers, of which nearly 40 per cent is paved. Of the entire 3,252 miles, Mexico has approximately half, or 1,712 miles, of which 915 miles is paved. Beyond Mexico the paved sections are scattered and disconnected except at the south end where in Panama a continuous section of 164 miles is paved. There are paved sections of varying length in each of the intervening countries, Guatemala and Nicaragua having the least. But Guatemala has a road passable in all weathers practically across the country, and Nicaragua has under way the largest paving program of any of the countries.

Further U. S. Cooperation

There has been laid before Congress a recommendation from the President and the Secretary of State that provision be made for further financial cooperation with the countries of Central America and Panama. The proposed authorization is for $20,000,000 which must be met by contributions from the other countries to the total of $10,000,000.

It is estimated, on the basis of past experience, that a large part of the contribution of the United States would be expended in this country for equipment, material and supplies, including also American services and personnel. The local contributions would carry local labor charges. If Congress makes available the funds contemplated in these recommendations, undoubtedly the program of construction will be augmented and expedited in all of the countries. The program under this plan is expected to extend over five years, with an expenditure of approximately $5,400,000 the first year and slightly less than $4,000,000 for each of the succeeding years of the period.

Office of Information On Government Purchases

Approximately 2,500 Federal government purchasing agencies purchase some 300,000 different articles. The magnitude of this purchasing set-up, especially in this grave emergency when first emphasis is necessarily placed on defense equipment for the expanding army and navy and for Great Britain, presents many problems which tend to confuse manufacturers who desire to cooperate 100 per cent.

Their attention is called to the fact that the Service and Information Office, established by Jesse Jones, Secretary of Commerce, is equipped to inform manufacturers, wishing to do business with the government, with whom they should get in touch and exactly how to do so. It is strongly urged that manufacturers *not* go to Washington until they have first opened negotiations through correspondence. Both the Army and Navy have decentralized their purchasing systems, and it is advised that manufacturers first get in touch with the Service and Information Office, Room 1060, Department of Commerce, Washington, D. C., from whom they can secure accurate information on the best procedure to follow.

Traffic treads were welded in place on a county bridge in Johnson County, Kans.

Treads Arc Welded On Bridge Floors

Loose bolts in the traffic treads on a 450-foot wooden bridge in Johnson County, Kansas, were the cause of many complaints to the county road commissioners. The treads on this bridge had originally been bolted through the bridge floor, but repairs were necessary every few months because the bolts became loose and noisy, and the loose treads were a hazard to motorists.

To remedy this situation, it was decided to butt-weld the 18 x 3/16-inch traffic treads to the bridge floor. All loose bolts were pried up with a bar and a bead was run around them, using a Hobart arc welder to do the job. This method saved the county the expense of building a scaffold under the bridge to replace the bolts, and fastened them in place permanently. Following this simple application of arc welding, it is reported that the traffic tread is still in excellent condition after six months of use by heavy traffic.

Graphite Lubricants For Construction Industry

The line of Dixon graphite lubricants for use on all types of construction equipment, for cables and wire rope, for the lubrication and coating of gaskets, pipe connections, and similar uses, and its belt dressing is described in a general catalog, No. R4, copies of which may be secured by interested contractors and state and county highway engineers direct from the Joseph Dixon Crucible Co., Jersey City, N. J.

Among the various types of Dixon products are the Ticonderoga flake lubricating graphites for use in engines and for gaskets; L & P lubricating and penetrating graphited oil for use as a rust solvent as well as a lubricant, which has proved of value in loosening nuts, bolts and rusted parts; the Dixon cup and pressure-gun graphited greases which are particularly adapted for all types of machinery used out-of-doors because of their maintenance of consistency over a wide temperature range; graphite waterproof grease for steel cables and wire rope; as well as the Graph-Air gun, lubricating sticks, and other lubricant accessories. It is stated that one of the features of graphite lubricants is their counter action to the destructiveness of sand and grit to which construction equipment is subjected.

New Asphaltic Coating For Road Aggregates

One of the problems in mixing and laying asphaltic road surfaces is that of moisture. In mixes, the aggregate must first be dried, and in road-mix operations it is necessary to wait until the material is dry, which after a rain often means respreading the windrow and delaying work until it has dried out.

To overcome this problem, a new liquid product known as Kotal has recently been developed by the Asphalt Treatment Corp., 140 Cedar St., New York City. Kotal is an easy-pouring liquid readily soluble in asphalt, cutback asphalt and in liquefiers. It combines chemically with finely pulverized quick lime, added subsequently, to form a plastic film which it is stated penetrates the entire surface of the aggregate, making possible an asphalt coating that is water-proof, freeze-proof, and will not strip, according to the manufacturer, because after entering the pores of the aggregate, Kotal has an affinity for asphalt. The application of Kotal does not increase the time of mix or change the proportions, and a mix so treated may be laid as a patch or a pavement, in cold weather, on wet surfaces, or even during a rain, it is claimed. Other uses for Kotal include the protection of aggregate stockpiles and of windrows on roads.

Further information on Kotal, which has been used in highway work in Connecticut, New Hampshire, New York, Pennsylvania, New Jersey, Vermont, Massachusetts, Washington and Ontario, is contained in a bulletin which may be secured from the manufacturer.

Rubber Tires Help In Soil Compaction

(*Continued from page 4*)

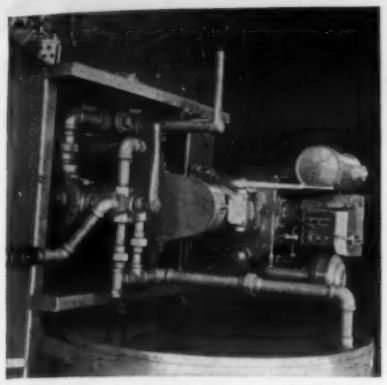
pressure as the maximum that can successfully be used and still maintain proper flotation, reasonable draft, and obtain proper compaction. It is therefore necessary that in some instances we have to recommend larger-section tires to carry a given load at these lower inflation pressures.

It is best to obtain ground contact through a flattening out of the pneumatic tire and thus compress the supporting material rather than forcing it sidewise by penetration of the tire. This action can only be attained when the inflation pressure in the tire is somewhere near the unit-supporting value of the soil. It is desirable to reduce tire penetration, or in other words, obtain flotation. In so doing, draft is decreased, fuel consumption is decreased, and in many instances the power unit can be operated in a higher gear, thus increasing the hauling speed and the number of trips per hour.

Economy of tire operation ties in very closely with this whole program and successful contractors have learned the value of starting out with adequate tire equipment and then following through with an organized tire service program. These measures insure longer tire life and lower cost operation not only through reduction of direct tire expense but preventing the indirect losses from service interruptions. Also, tires that have had proper care may possibly be retreaded for additional low-cost service.

If you have extra copies of this article available, we could use three or four to very good advantage, and would appreciate very much having you forward them.

Very truly yours,
L. W. Fox,
Sales Engineering Division,
Development Department,
Firestone Tire & Rubber Co.



Rear-end assembly of the American maintenance distributor, showing the pump, valves and fittings for handling the heated material.

Distributor Units On Trailer or Truck

American all-purpose pressure distributor units, in capacities of from 400 to 1,200 gallons, mounted on trailers or for truck mounting, are made in three models designed particularly for the many and varied highway maintenance operations carried on by state, county and town highway departments. Built low and well-balanced, with internal baffles and Timken heavy-duty tapered roller bearings to facilitate high-speed patrolling, these units will handle road oil, asphalt, tar, and emulsions, for penetrating, patching, crack filling, black-top maintenance, shoulder stabilization, relocation and widening shoulders or curves.

The tank is elliptical in shape, with all seams electric welded. The chassis is a separate unit, rugged in construction to support the tank and all the equipment. Control of distribution is by a master valve lever which controls all spray bars, while a loading valve lever controls the loading and draining of the tank. Power is furnished by a 4 to 7-hp air-cooled single-cylinder engine connected to a Viking positive-displacement rotary pump which permits various operations under uniform pressure. Heat is furnished by two American Fireblo burners, each developing over 2,000 degrees F., mounted at the front of the unit, with an auxiliary burner at the rear for heating the material pump and pipe lines preparatory to starting operations in cold weather. American units are regularly equipped with one hand spray bar and one 4-foot surface spray bar, the latter fitted with eleven brass spray nozzles on 4¾-inch centers. Pressure at the nozzles is 35 pounds.

Model AJ is a single-axle dual-wheel trailer-mounted unit, with either pneumatic or solid rubber tires, in capacities of 300 to 600 gallons; Model AM is a two-axle four-wheel trailer unit and is available in capacities of 400 to 1,200 gallons. Model AT, in 800 to 1,200-gallons capacities, is designed for truck mounting.

Further details and specifications on American maintenance distributor units are contained in Bulletin B, copies of which may be secured direct from the American Steel Works, 1211 West 27th St., Kansas City, Mo., by mentioning this item.

New Wagon Drill

The new C-P Type G-500 wagon drill, recently announced by the Chicago Pneumatic Tool Co., 6 E. 44th St., New York City, is especially designed for deep-hole drilling, up to 40 feet, on highway and railroad construction, rock cuts, dam and canal excavation, or any class of rock excavation where steel changes in excess of 36 inches are practicable and large-diameter holes are effective.

The sturdy tubular steel base is equipped with steel wheels for easy transportation from hole to hole and is so designed that it can be converted from wheel to skid mounting if desired. Feeding the drill to the work is by gravity, due to the weight of the drill with its mounting slide and adjustable weights, while raising is by means of either an air or hand hoist. Operated by a hand crank, the tilting tower permits adjustment from 25 degrees either side of vertical, in addition to a lateral adjustment of 7½ degrees either side of vertical to facilitate angle drilling and compensate for rough and sloping surfaces. A locking device holds the tower in any desired position.

The G-500 wagon drill is regularly equipped for 10-foot steel changes, but can be furnished for 15-foot changes on special order. The mounting slide is provided with four removable weights for regulating feed pressure, and a drill steel centralizer facilitates the starting of holes and takes the whip out of long steels. A C-P drifter suitable for any formation or depth of hole may be readily mounted on the G-500, although for most drilling conditions the 4-inch CP-70 drifter is recommended.

A new 4-page bulletin, SP-2024, illustrating and describing this new wagon drill has just been issued. Copies may be secured direct from the manufacturer by referring to this item.

New Bulletins on Tools For Servicing Tractors

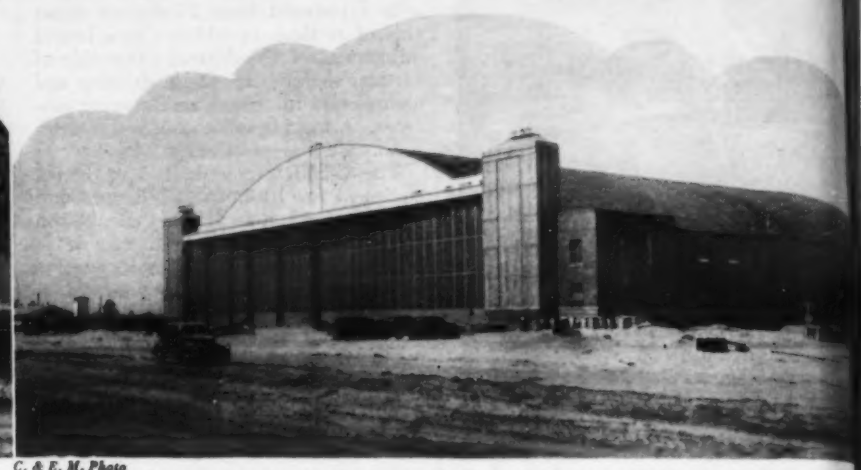
Service men who maintain either the Cletrac or General line of tractors will find useful information in a new service bulletin, No. CL-6, recently issued by the Owatonna Tool Co., 348 Cedar St., Owatonna, Minn. In addition to pulling tools for the removal and replacement of bearings, gears and other parts, this bulletin describes the new Snap Ring tools, cylinder sleeve pullers for removing Buda motor dry sleeves, drive sprocket pullers, piston ring expanders, piston-ring groove cleaners, and two complete sets of hand service tools.

Copies of the bulletin may be obtained direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

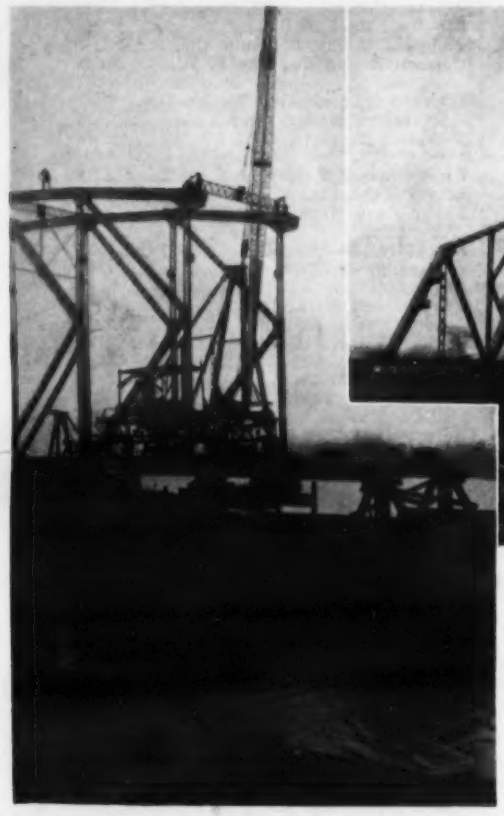
Index to Advertising

Contractors and Engineers Monthly

C. & E. M. Photo
Concrete for paving the concrete floors in the new hangars at Westover Field, Mass., was batched in this Blaw-Knox plant owned by P. J. Keating of Fitchburg.



C. & E. M. Photo
One of the five new hangars at the Army Air Base at Westover Field, near Chicopee Falls, Mass., the paving of the floors of which is described in this issue. See page 1.

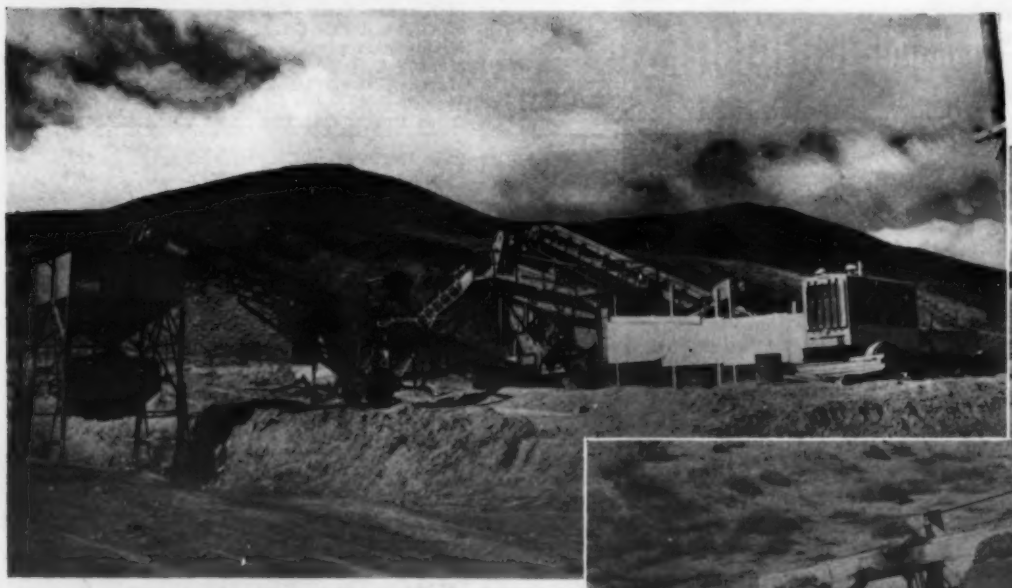


C. & E. M. Photos
The center span of the Wax Lake Outlet highway bridge being erected on barges preparatory to floating into position. In the background is the easterly span which was also built at the west end and floated to its permanent location. The structure to the right is the railroad bridge built entirely over dry land to be removed later to permit the flow of flood waters through the channel.

Photo at left shows a close-up of the erection of the center span of the highway bridge. See page 2.

C. & E. M. Photo
A general view of the Virginia Department of Highways' sand and gravel plant, near Providence Forge, Va., which furnishes aggregate for state highway maintenance work or for construction of state roads in the vicinity. See page 42.

C. & E. M. Photo
The well-planned asphalt plant owned and operated by M. A. Gammino Construction Co., Providence, R. I. See page 32.



Above, the Pioneer 48-V duplex portable crushing plant which furnished the aggregate for the plant-mix asphaltic surface on a 17-mile reconstruction project on U. S. 40 in Nevada, the contract for which was awarded to Fredericksen & Westbrook of Sacramento, Calif. At the right, a D6 tractor equipped with a LeTourneau bulldozer and pulling a bottomless scraper which was used as a clean-up rig and for sloping fill banks on this 17-mile project west from Lovelock, Nevada. See page 2.